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PREFACE.

THE Committee of the *Wiltshire Archæological and Natural History Society,* under a deep sense of the great liberality of MR. BLACKMORE in founding the Magnificent Museum at Salisbury, which is called after his name; and profoundly sensible of the immense benefit to the Archæologists of Wiltshire, which the possession of this Museum within their county confers, have thought fit to mark their sense of obligation and gratitude to the munificent founder and his coadjutors, by offering in the name of the Society to publish a general account of the Museum, as well as the proceedings which accompanied its inauguration, and the papers read thereat: a proposal which MR. BLACKMORE has cordially accepted.

But though undoubtedly an earnest desire to do all honour to the generous founder of the Museum, and his allies, was the main intention of the governing body of the Society, in making this proposal; the Committee feel that the publication of some general account of the Museum, and of the interesting proceedings which attended its opening, cannot be otherwise than pleasing to all its members; inasmuch as the collection is in certain sections of unrivalled value, while the papers read, the addresses and discussions which celebrated its inauguration, are of extraordinary merit.

Moreover, in addition to the present interest of its members, and the debt of gratitude due to MR. BLACKMORE, which it wishes to discharge, it seems incumbent on the Archæological Society of Wiltshire to seize the opportunity offered of stretching out the hand of welcome to one, who more than any other individual, has advanced the cause of Archæology in this county in so signal a manner: and at the same time to diffuse throughout the county the light which has been kindled so brilliantly at Salisbury, and to preserve and treasure up the records of all that took place on the eventful days of inauguration, when Archæologists of eminent, and even European renown, assembled in our county, to take part in the proceedings which attended the opening of the Museum.

Of the contents of the Blackmore Museum, it seems superfluous for the Committee to speak here, inasmuch as its treasures will be examined in detail in these pages. Suffice it for the present to say, that the Committee heartily endorse the encomiums which have been passed upon it on all sides, and are fully alive to the value of the collections which have been so munificently deposited within the county.

And here in the outset the Committee desire, formally indeed but as cordially as possible, to offer the hearty thanks of the Archæological and Natural History Society of Wiltshire, and through that Society they venture to say of the county generally, to Mr. Blackmore, who in so noble and patriotic a spirit, has placed within his native city the magnificent Museum which will be described in these pages, and has stored it with a large, varied, and well selected series of specimens from different countries, belonging to the earliest period of human occupation, or the "stone age" of antiquaries.

Nor can the Committee feel that they have discharged their duty, until they have expressed their thanks to Dr. Humphrey P. Blackmore, the brother, and Mr. Edward T. Stevens, the brother-in-law of the founder; Co-trustees and Curators of the Museum: whose labours, intimate acquaintance with the subject, and correct taste, have done so much towards carrying out the intentions of their liberal relative. To these gentlemen the Committee are also indebted for much of the matter contained in these pages.

In concluding these few words of preface, the Committee heartily commend, not only an inspection of the Blackmore Museum, but a careful and deliberate study of its contents to every member of the Wiltshire Archæological and Natural History Society; fully assured that thus only will be gained any adequate idea of the extent as well as the value of this most admirable collection.

ALFRED CHARLES SMITH,
(Hon. Sec.)

Yatesbury Rectory,
July, 1868.

OPENING OF THE Blackmore Museum, at Salisbury.

SEPTEMBER 4TH, 5TH, AND 6TH, 1867.

THE Blackmore Museum founded in 1864, at Salisbury, by Mr. William Blackmore, of Liverpool and London, is situated near the Salisbury and South Wilts Museum, in St. Ann Street. Externally it is a plain, unpretending structure, built of brick with stone dressings. It consists of one large room, 70 feet long, by 35 feet wide, with an entrance porch on the north, and a committee-room and other offices at the rear. The large room is well lighted, and of good proportions; it is covered with a hammer-beam open timber roof, the lines of which and the leading features of the building are relieved by a judicious use of polychromy: this imparts a furnished and comfortable appearance to the Museum, the effect of which is greatly heightened by the warm tone of the encaustic tile floor. The collection is deposited in cases placed round the walls, and in others which occupy the central portion of the room. Eight of the latter are double, and are admirably contrived for the convenience of students. Above the mural cases an embattled cornice, beautifully gilt and coloured, runs round the building. The Entrance Porch is even more richly decorated than the large room, the walls and roof glow with colouring, and at the sides there are two stained glass windows, in which are emblazoned the arms of the See and of the Salisbury and South Wilts Museum, the City arms, and those of the Blackmore Museum. Over the entrance doorway, on the interior wall, are the arms of the founder, and also those of the two honorary curators (Dr. Blackmore and Mr. E. T. Stevens). Beneath the mullions of the west window are the arms of some of the European Countries represented in the collection, viz., Switzerland, Denmark, France, Great Britain and Ireland, and Italy. Beneath the east window are the arms of American States, from whence some of the specimens have been derived, viz., Peru, Canada, United States, Nova Scotia, and Mexico. The room is effectively warmed with hot water, the pipes being enclosed in iron ornamental panelling. The building is lighted with gas, and the decoration is perhaps even more effective by gas light than by daylight. This is probably attributable in some degree to the large quantity of vermilion which has been employed to relieve the sombre tone of the roof, and the cold effect of the grey walls. The tablets upon which the specimens are mounted are of a neutral green tint, which throws up the specimens, and isolates them from surrounding objects. Every specimen is so close to the glass of the case that it can be examined most minutely; fortunately also there is a total absence of that painful reflection and glare from the glass, which is not unfrequently experienced in Museums.

THE Museum was formally opened to the public on Thursday, September 5th, 1867, but the proceedings commenced on the previous evening, with a Converzatione held therein, and in the Salisbury and South Wilts Museum, at which, by invitation from Mr. and Mrs. William Blackmore, about 400 Ladies and Gentlemen assembled. To ensure the comfort of their guests neither pains nor expense had been spared. The broad walk leading from the one Museum to the other, which is planted on each side with roses and other flowers, was covered in, carpeted, and lighted with gas. A number of choice ferns and exotics, kindly lent by some of Mr. Blackmore's friends, added to the pleasing effect of this improvised corridor, whilst at intervals chairs and couches were placed for the accommodation of visitors. The circular room belonging to the Salisbury and South Wilts Museum was decorated with hothouse plants: tables were substituted for the show-cases, and it was converted into a refreshment room. About half-past eight a Concert was given in the Blackmore Museum, under the direction of Mr. C. R. Read, of the Royal Academy of Music. The *artistes* engaged were Miss Cecilia Westbrook (a well-established favourite with musical circles in Salisbury), and Messrs. Carrodus, Calkin, Colchester, Pettit, Strugnell, and Young. Miss Westbrook possesses a pure and sweet voice, and her efforts were so successful as to obtain for her on this occasion the well merited honour of a double *encore*. The solo of Mr. Carrodus was executed in a manner which fully justified his reputation as one of the most finished performers on the violin in Europe. From the few detached bars which it was possible to catch at intervals in the solo of Mr. Pettit there can be little doubt that his *Fantasia* evinced the fine tone, expression, and accuracy of finish of a master of the instrument, but unfortunately the hum of conversation, prompted, no doubt, by an enlightened interest in the instructive objects with which the surrounding cases were filled, and which neither the well-earned popularity of Miss Westbrook nor the fame of Mr. Carrodus had been able to subdue, became wholly irrepressible at this point, and we can only admire the nerve and good temper which enabled Mr. Pettit to complete his task under such adverse circumstances. The last piece was Beethoven's celebrated Op. 20 which was vigorously and brilliantly executed. Where all performed their parts so well it seems almost invidious to particularize any executant, but it would be unjust not to say that all who could appreciate a powerful, exact, and expressive rendering of one of the greatest works of the greatest composer of instrumental music, must have been delighted at the way in which the first violin and viola parts were played by Mr. Carrodus and by Mr. Colchester. Mr. Read presided at the pianoforte during the evening.

Whilst this was taking place, another section of the guests assembled in the new room of the Salisbury and South Wilts Museum to listen to the reading of papers, bearing upon the pre-historic collection in the Blackmore Museum.

Mr. E. T. Stevens proposed that Earl Nelson should preside over the meeting. On a former occasion, at a most enjoyable meeting, when the Wiltshire Archæological Society had come to Salisbury, Lord Nelson proved himself a very admirable president; and doubtless what he was then might be taken as a guarantee of what he would be now.

Earl Nelson in opening the proceedings, said that he was afraid it did not follow he should be a good commander on the present occasion, because on a previous one, he had presided over the Wiltshire Archæological Society, with the assistance of Mr. Stevens as his lieutenant. He would however do his best. His Lordship then said that in common with himself, all must have been struck with astonishment at the Blackmore Museum, and at the admirable manner in which the specimens were arranged—they were all on the eye level and each individual object could be seen and minutely examined with the greatest ease. He advised his hearers, after they had heard the papers, to visit the Museum, and to derive benefit from what was there by quietly studying the specimens: he would not detain them longer, but would call upon the readers of the papers. He was quite certain that with such an audience as he saw before him he should have no difficulty in managing the meeting to the satisfaction of all. After the papers had been read, opportunities would be given to the gentlemen present for discussion, and of this he trusted that many would avail themselves.

His Lordship then called upon Mr. Evans to read a paper on "Man, and his earliest known works."

MAN AND HIS EARLIEST KNOWN WORKS.

Mr. JOHN EVANS, F.R.S., F.S.A., &c., said:—My Lord, ladies, and gentlemen, I have been asked to read a paper to you this evening, and it gives me great pleasure to comply with the request which has been made to me; assembled as we are in the immediate neighbourhood of what I may call a perfectly unique collection of antiquities, relating to the stone period of various countries, such as is not to be met with in any other town in this country, with the exception perhaps of London. And when we consider that this collection has been formed by the liberality of a gentleman connected with this town, and by the energy of others residing in it, I am sure that any one residing in this neighbourhood must feel that a large debt of gratitude is owing to those gentlemen who have exerted themselves in such a manner for the public good. I am called upon to read a paper, but unfortunately I am unable to read what has not been written. I have not had time to prepare a written discourse such as I thought would be acceptable to you, but I have placed together a few heads upon which I hope to address you, and perhaps to interest you in the subject on which I have to speak. But in so doing, I feel that in the audience before me there are various classes. Some of you, perhaps, know little or nothing with regard to the objects to which I am about to call your attention, while others may know, perhaps, as much as myself. There are always two ways in which gratification may be derived from a lecture. One of these is when you derive new information from the lecture which has been given to you: the other is, when you feel that you yourselves know quite as much as the lecturer has been able to tell you; and I think that among the present audience, there are probably some who may be able to derive each of these different kinds of enjoyment.

The subject which I have chosen is that of "Man and his earliest known works;" and in addressing you upon that subject, I intend more particularly to call your attention to those works of stone, the various implements, arms, and utensils, manufactured of stone, in which this collection of the Blackmore Museum is so rich. And in doing so, I have no intention of entering, deeply at all events, into mere speculative points. I think it will be better if I call your attention more particularly to the various forms and characters of these different implements, rather than to the age, or the degree of antiquity assigned to them, though of course I must, to some extent, speak to you on that point also.

I may mention that a great deal of what I have to say has already been forestalled by Mr. Stevens, in the admirable notice which he has printed of the contents of the Blackmore Museum. You will, indeed, in that notice, find a short abstract of nearly everything upon which I am about to address you. But I felt that although you had here a notice in abstract of the contents of this Museum, I might, perhaps, be able to give you some slight additional information, by going into further details than Mr. Stevens could do in what, necessarily, was so concise.

You are aware that the stages of the civilization of man have been divided by modern antiquaries into different Periods. More especially the school of Danish antiquaries has of late years called attention to the possibility of dividing the antiquities of each different country, in western Europe at any rate, into three different stages: the ages of Stone, of Bronze, and of Iron. The iron age is generally considered to have commenced in this part of Europe at time immediately preceding the Christian era. The bronze ag may be considered to have ranged from one to two thousand year previous to that time; while the stone age represents the occupatio by man of these countries during a previous period.

But it is not only the Danish and other modern antiquaries wh have divided antiquity into these different periods. We also find hint of a similar idea pervading the minds of the early poets and historians. Even so early as the time of Hesiod,[1] who wrote about 850 years B.C., we find mention of a previous race of men who worked in brass, and to whom black iron was unknown. Lucretius, in his great poem, also mentions his opinion with regard to the means by which the early races of men armed themselves, and provided themselves with implements. He says the early weapons were the hands, the nails, and the teeth, stones, and branches torn from trees. Afterwards was discovered the power of iron and of brass. But the use of brass was earlier than that of iron. I have translated it for the benefit of the ladies, but no doubt some would like to hear the original passage:—

> "Arma antiqua manus, ungues dentesque fuere,
> Et lapides et item sylvarum fragmina rami,
> Posterius ferri vis est ærisque reperta,
> Sed prior æris erat quam ferri cognitus usus."

Pausanias[2] again, about A.D. 174, cites Homer, who wrote in the 10th century B.C., to prove that in the heroic days arms were of bronze. He especially mentions the axe of Pisander, and the arrow of Merionas—the spear of Achilles preserved in the Temple of Minerva at Phaselis, the point and ferrule only of which were of bronze—and the sword of Merion in the Temple of Æsculapius at Nicomedia, which was wholly of bronze.

It is a curious thing connected with these arms of the heroic age that Augustus made a collection of them for one of his country residences. It would appear that he collected the fossils of the large mammalia of Italy, together with bronze armour, in the same manner as you will find here the bones of the extinct mammals of the drift of Salisbury and these ancient weapons and implements collected for the Blackmore Museum.

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[1] Χαλκῶ δἐιργάζοντο·μέλας δ'ουκ ἔσκε σίδηρος.

[2] Lib. iii., p. 211, ed. 1696.

With regard to the successive stages of civilization, as represented by these three ages—of stone, bronze and iron,—of course there may be two theories: one that mankind has successively deteriorated from a comparatively perfect original: the other that there has been a successive development and improvement of the human race. It is not for me to argue on the present occasion as to which of these views is most worthy of acceptance; but I think that it is, to say the least, more probable, judging from the existing order of things, that there has been a successive improvement and development of civilization, rather than a gradual deterioration.

I think that if even our grandfathers could see gas, railroads, the electric telegraph, and other inventions of this age, they would consider that there had rather been an advance in the arts of civilization than a deterioration. And in the same way we may consider generally that in all countries, as far as we are able to trace the history of civilization, it began at a comparatively low ebb, and gradually increased; and moreover that that increase has very often, though not always, taken place not from within, but from contact with nations from without.

But this is a large subject on which I need hardly enter at the present time. There are, however, certain evidences which may be taken, from actual discoveries, to bear out this view of a gradual advance of civilization from one stage to another: from that of stone, bone, and wood, to that of bronze; and subsequently from that of bronze to that of iron. In the Lake dwellings of Switzerland, we find settlements in which stone, bone, wood, and similar non-metallic materials were employed; but above them we find traces of the use of metals. In the same way, in that remarkable cemetery with which some of you may be acquainted, at Halstatt, in the Austrian Tyrol, most of the graves of which have been examined by Herr Ramsauer, we find arms of iron exactly uniform in shape and design with those of bronze. We find a gradual passing, however, from bronze swords and daggers into the use of iron which evidently supplanted it at that point. There is some difficulty in ascertaining the exact age of that cemetery, but it would appear that in that part of Germany the transition to the use of iron took place some centuries before Christ.

But although you have these distinct periods of stone, of bronze, and of iron, it would be a mistake to suppose that every object of stone of necessity belongs to the stone period, or that every object of bronze, of necessity belongs to the bronze period. No doubt, after the use of metals was discovered, there continued to be used for certain purposes the more accessible material of stone, especially in cases where the object formed was liable to be lost, or where stone was better adapted for the purpose than metal. Even in the present day, I have myself seen stone implements in use in the streets of London. I have there seen a stone hammer used for cracking Brazilian nuts, but nevertheless it would be wrong to infer that London was in the stone age of civilization. In some parts of Africa, and even of Ireland, iron is actually wrought with stone hammers upon stone anvils. You must therefore regard, (as you will see pointed out in the notice of the Blackmore Museum, issued by Mr. Stevens,) these periods rather as denoting stages of civilization than any actual chronological periods.

There are at the present time some countries in which the use of metals is unknown, and where the stone period is still in existence. In the Blackmore Museum you will see illustrations derived from the implements of those countries which will throw light upon similar implements found here and elsewhere. It is, of course, also possible that this gradual development from stone to bronze, and from bronze to iron may not have taken place in all countries. I think for instance that possibly in some parts of Africa the transition took place directly from stone to iron without passing through the intermediate stage of bronze.

I must, however, come to the more immediate subject of my lecture. In Western Europe the stone period—the period in which stone was principally used for arms, utensils and cutting implements, is susceptible of division into two distinct parts; for which Sir John Lubbock has proposed the names of Neolithic and Archæolithic, —the new stone period, and the old stone period.

Of the new stone period, you find implements existing in the encampments, in the barrows, and in other places upon the surface of the soil; and in general among them you will find a certain number which have been polished or ground upon a grindstone. In the Archæolithic period, the implements, as far as we at present know, were never ground or polished. They generally occur, moreover either in caves or in the gravel-beds belonging to certain river valleys.

I propose this evening to limit myself to the Neolithic or Surface stone period. To-morrow evening, I hope to have the honour of speaking upon the subject of the Archæolithic or the River-gravel period.

Implements belonging to the Neolithic, or Surface period, occur in almost all the countries of Western Europe; but in some countries, as Denmark and Ireland, they are in greater abundance than in others, and this probably is not so much due to the original greater abundance of these implements, as to the fact that the soil has not been brought under cultivation to the same extent, at so early a period as in England, France, and some other countries.

Now the implements of this period may be sub-divided into a considerable number of forms, such for instance, as hatchets or celts, grind-stones, hammers, perforated axes, chisels, gouges, spear-heads, daggers and knives, crescent-formed implements, arrow-heads, scrapers, borers, punches and picks, besides simple knives or flakes, and the cores from which they were struck. These are the principal forms, and on most of them I propose to say a few words, if time will allow.

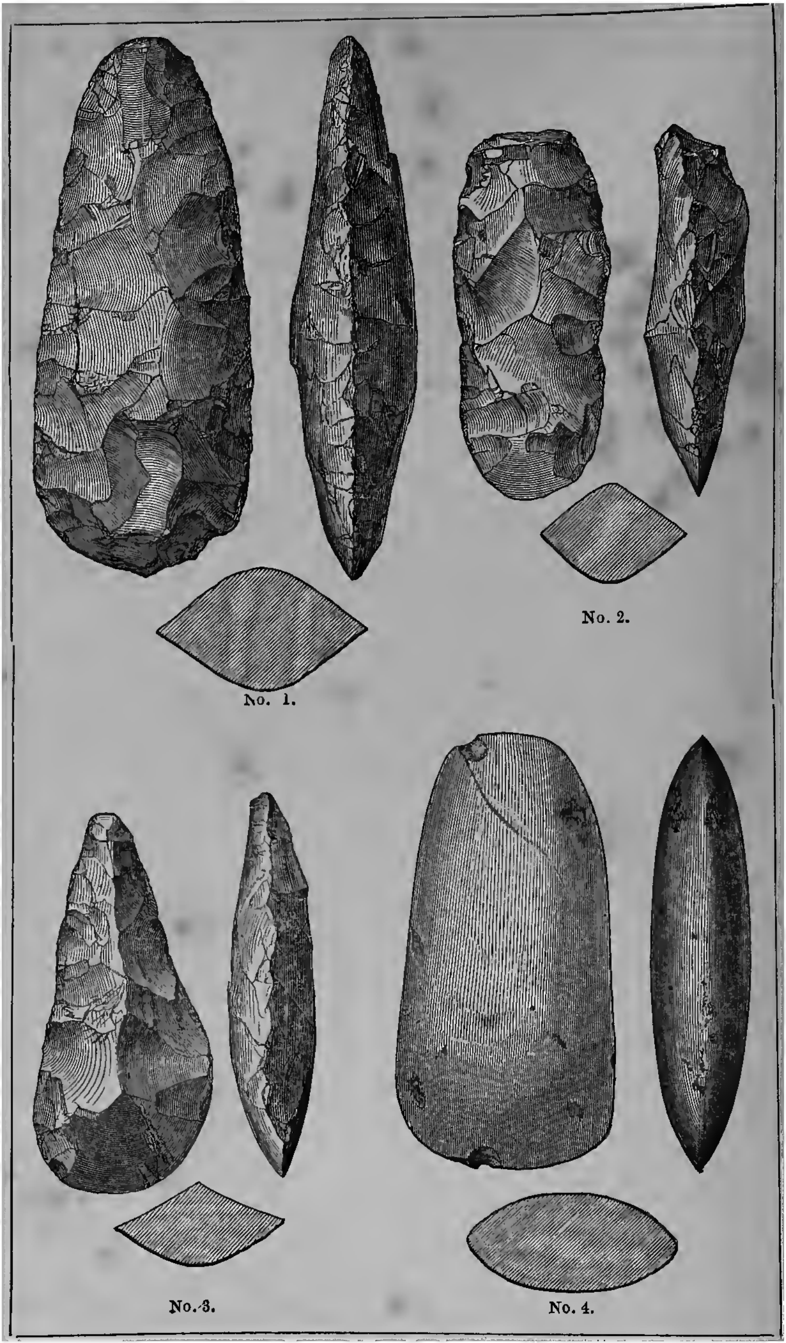
The first, as being the most generally known of these forms, is that which is generally known as a celt or hatchet. Of late years a certain number of people have taken upon themselves to call this *celt* a *kelt*. When, however, you consider the derivation of the word, you will see that you must call it *celt*, if you please, and not *kelt*. It is simply the English translation of the Latin word *celtis*, a chisel. The first application of the term to a bronze celt that I have met with, occurs in Beger's Thesaurus Brandenburgenis, 1696. The only authorities for the word *celtis* appear to be the Vulgate translation of the Book of Job, and a forged inscription recorded in Gruter.

They are found in every country in Europe, and frequently have some virtues superstitiously attached to them by those who find them. The ordinary name by which they are known in France, Germany, and some other countries is that of thunderbolts. In Greece they are known as "astropelekia" or axes that fall from the stars. So early as the time of Pliny, they were known as thunderbolts. Pliny, quoting Sotacus, says there were two sorts of *ceraunia*, to wit the "black and the red, saying they do resemble halberds or ax-heads, and by his saying, the black and such as be round withal are endued with this virtue that by meanes of them cities may be forced and whole navies at sea discomfited." Marbodæus, a Bishop, who wrote in 1123, also mentions these things in a book concerning Gems. He says that after thunderstorms, these stones fall from the clouds.

"Ventorum rabie cum turbidus æstuat aer,
Cum tonat horrendum, cum fulminat igneus æther,
Nubibus elisus *cælo cadit* ille lapillus.
Qui caste gerit hunc à fulmine non ferietur,
Nec domus aut villæ quibus affuerit lapis ille.

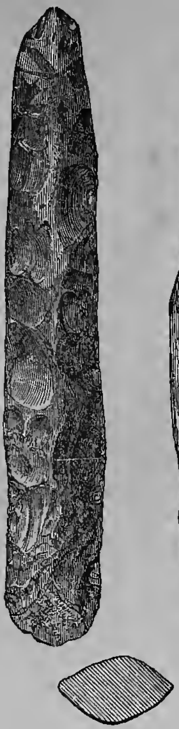
Aldrovandus, in 1607, quotes Gesner, and describes instances where these stones have been found under the roots of trees which have been struck by lightning. One of these was of Basalt, a stone at that time used for anvils in Germany. Gesner in his book, gives drawings of two of these stones, one of which was found in the cellar of a house which had been struck with lightning. The other passed through an oak tree, and was found beneath its roots. Curiously enough, these stones are perforated; and Gesner enters upon a discussion as to how such perforation could take place in matter generated in the clouds.

In China, Germany, France, Italy, Shetland, and elsewhere, they are still regarded as thunderbolts, and have sometimes been preserved in families for centuries, on account of their valuable properties. "They preserve from thunder, perspire before storms, are good for diseases of man and beast, increase the milk of cows, and powder scraped from them may be taken internally for childish disorders." I have, in my own collection, a specimen of green-stone with the date inscribed on it, 1571, and no doubt that stone was preserved in a German family until within the last few years,


No. 1.
No. 2.
No. 3.
No. 4.

Forms of Stone Implements.

Nos. 1 and 2—Chipped Celts. No. 3—Celt ground at edge. No 4.—Polished Celt.
All half size.



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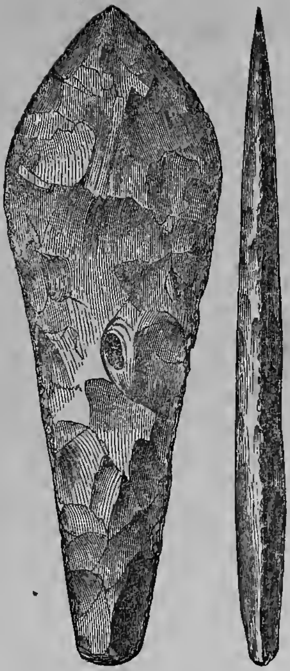

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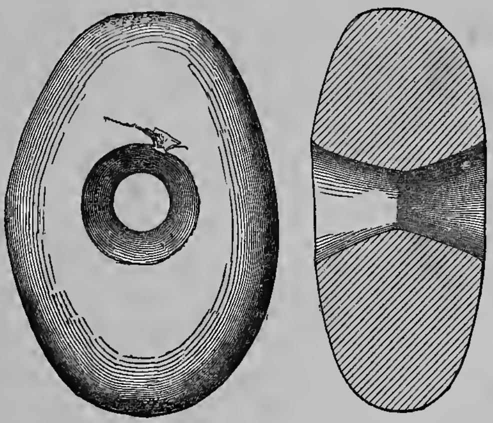

No. 6.

Forms of Stone Implements.

No. 5—Pick. No. 6—Hammer. No. 7—Dagger or Spear-head.

All half size.

as being a preservative of this kind. Only two years ago, when in Ireland, I heard of one being sent round among neighbours, to be placed in troughs, from which cattle drank, in order to preserve them from disease.

In India the same superstition is attached to these celts. They are preserved in Temples and sacred places, and are frequently adorned with red paint, as *mahadeo*, or sacred. Even in England in an early No. of the "*Philosophical Transactions*," you will find a paper by Dr. Lister, in which he regards these celts as being naturally formed without any artifice.

But I must now proceed to the consideration of the forms of these celts, rather than the superstitions attached to them. Of these we have three varieties, frequently found in this country. The first variety is that which is simply chipped, without being at all ground or polished. I have here a specimen (No. 1), in which you will see the general form of the hatchet is given, but there is no trace of grinding whatever. Whether a hatchet of this kind was intended eventually to be polished, is a question that no one at this time can answer. There are some which do not appear to have been intended to be ground, as they are chipped in so dexterous a manner (like No. 2). In hatchets of this kind the edge was formed by the junction of two facets, producing a semi-circular outline. The edge was formed simply by two blows. A flake was removed from one side, and another flake from the other side, and that so dexterously that the intersection of the two surfaces formed a nearly circular edge, as sharp, or even sharper, than if it had been ground. They are not of very common occurrence, and are rather remarkable as having a peculiar curvature inwards, showing that in all probability they were intended to be fastened by a string to a handle.

The next variety is that in which the body of the celt has been left untouched after being chipped out and the edge alone has been ground (like No. 3.) Others (like No. 4) are ground all over. They vary in size from two or three inches in length to as much as fifteen or sixteen inches. The sections also vary. Occasionally they are almost cylindrical.

Another form of these celts, or allied to them, is that known as the pick, rather than as the celt. In this case it is a longer shaped implement, (like No. 5,) with a sharper and narrower edge. If the purpose to which it was to be applied was changed, there was a corresponding change in the shape of the implement to be used, and accordingly we may expect to find a variety of forms of these celts, as well as of the material of which they were made. In some districts they are generally made of flint. In others they are formed of green-stone, or some hard metamorphic rock. In this part of the world where flint was abundant, that was, of course, the best material that could be used for the purpose. In a case at the other end of the room is a collection of implements found by Mr. Stevens (of St. Mary Bourne, near Andover), upon the surface near his own residence, in which you will find a considerable number of celts in a roughly chipped form, and one or two partially ground. The method of handling or hafting will be best illustrated by ancient and modern specimens in the Museum. You will see that some of them were adapted for insertion in a socket of stag's horn, and this socket was attached to a wooden handle. In other cases the celt itself was inserted in a hole in the wooden handle. In others, again, the stick forming the handle had a projecting branch, in which the stone celt was inserted.

As I said before, you will find a great majority ground or polished, either at the edge or on the surface; and of course the question arises, how was this grinding or polishing effected? we find however, from time to time the stones on which this grinding was carried on. I have here a small Danish grindstone, with a concave surface, which seems admirably adapted for sharpening the edges of these implements. And you will see in the Museum several specimens of grindstones by which the grinding of stone axes or celts was no doubt effected. There is no trace of revolving grindstones having been used, but the celts were ground on a fixed stone in the same manner as masons grind their chisels at the present day.

Another form of stone implement is that of the hammer, and of these we have various kinds, in some cases they were perforated and in others unperforated, as when a round nodule of flint was used as a hammer. You often find in connection with other stone implements, round pebbles or flints with a bruised surface all over. Others will have an indentation at each side for holding by the thumb and finger; and generally speaking the contour of the figure has been bruised, apparently from chipping other stones: other hammers (like No. 6) had a hole through them, in which a handle might be inserted in the ordinary manner in which we put on the handle or haft of a hammer at the present time. Possibly, some with round holes were not actually hammers, but, as is the case among some savage tribes, fly wheels used in one of the methods of procuring fire by friction. Some also may have been attached to thongs and used as weapons of offence.

Next in order come the perforated axes, and of these also there are two varieties; some cutting at both ends, others merely cutting at one end, and being hammerlike at the other. These also were regarded among a great many nations as thunderbolts, and as such were engraved by Gesner. Some philosophers thought they were iron implements petrified from long lying in the earth. These perforated axes do not in all cases certainly belong to what must be called the stone period, because you will find that in many instances, perforated stone axes remained in use long after bronze was employed for daggers. In Sir Richard Colt Hoare's "*Wiltshire,*" are accounts of several barrows in which perforated stone axes were found associated with bronze daggers.

Another of the forms to which stone was adapted is that of the chisel. These chisels are very rarely found in England, but occur frequently in Denmark, but why there should be this scarcity in one country and abundance in another I am not able to say. As a means of cutting wood, it is curious, if you employ a mallet, how effectual you will find these flint chisels to be, especially in the case of green wood. The edge will stand in a manner that you will hardly expect it capable of doing, though it must have required occasional grinding. We always find among savage nations who use stone cutting tools, a grindstone on which they are constantly sharpening their edges, and by means of these stone implements, results are produced almost as good as if metallic tools were employed.

Gouges, again, are rarely found in this country, but are abundant in Denmark. Their curved edges are well adapted for hollowing out canoes, and similar purposes. I have a specimen that shows marks of having been long in use, the butt end being battered in a most wonderful manner, it is in fact, almost used up to a stump.

Another form to which flint was applied was that of the spear-head or lance-head, a long, pointed implement, of which No. 7 will give an idea. Some of these, twelve inches in length, are chipped with perfect symmetry, and are wonderful instances of command over a very intractable material.

A curious feature with regard to these flint blades is, that they have sharp edges for a considerable distance from the point, but as you get towards the butt end, these edges have been carefully removed by grinding, apparently with the view of preventing the cutting of the string by which they were attached to the haft or handle.

Another form that occurs in flint, is that of the dagger or knife. This also is of extremely rare occurrence in England, but is more frequently found in Denmark. It is interesting to notice how frequently the use of stone knives and daggers is associated with ancient religious observances. For instance, Herodotus, in his account of the method of embalming the dead, mentions that the Egyptians opened the body with a sharp Ethiopian stone. In the Berlin Museum, I have seen some knives or daggers of flint chipped out in almost identically the same form as those we find in Denmark, and these from one or two instances, appear to have been inserted into wooden handles, and used in exactly the same way as metallic knives would have been. Owing to the superstition that attached to the use of stone—from the knowledge of its having been in early use—stone knives were probably retained for this purpose of embalming the dead for a lengthened period after stone had ceased to be used for cutting purposes in ordinary life. Flint knives were also used by the Israelites in religious rites. Take for instance the occasion when Zipporah made use of a sharp stone, or as the Syriac and Arabic translations have it, "a sharp flint." We are also told that Joshua made him sharp knives and circumcised the children of Israel. In the Septuagint translation, these knives are said to have been "placed in his tomb, and there they remain until this day." This, as Gesenius says, is a circumstance worthy of remark, and goes to show at least that knives of stone were found in the sepulchres of Palestine, as well as in those of north-western Europe. Atys also, according to Ovid, is said to have maimed himself with the same sort of instrument.

Another form in flint is a crescent shaped implement, the use of which, I must confess, is unknown. It appears to have been inserted in a wooden handle, inasmuch as round the circular part there are often polished markings, showing how far the handle went. The edges were generally much polished, showing evident signs of use. Whether they were used as saws, or for hackling and preparing flax and hemp or for other purposes is an undetermined question.

Another form is that of the arrow-head. It is very curious, as showing the antiquity of these, that at a very early period they were regarded as having some superstitious use or value. One of them forms the central pendant of a Greek[1] or Etruscan gold necklace in the British Museum. They are also frequently set in silver, and worn by Scotch and Irish peasants as charms against sprites and witchcraft. They are called elf bolts, and are supposed to fall from the clouds. It is still more curious to find among the Arabs of the present day small imitations of this implement, in red cornelian, which are perforated and worn round the neck as charms, as being good for the blood. Arrow-heads of flint and siliceous stone are found in almost all countries, and of course the purpose to which they were applied being the same, their form wherever found is usually almost identical. There are of course varieties in different countries, but still their general appearance is the same, and this similarity of form, when found in various countries, suggested to Mr. Woodward, author of the *Method of Fossils*, that possibly the first model was brought from Babel to the various countries whither the several colonies sent thence made their migrations! In Greece, on the field of Marathon—(B.C. 490)—both bronze and flint arrow-heads have been found. And it is curious that in the account of the army of Xerxes, who subsequently invaded Greece, Herodotus mentions the Ethiopians as having long bows, and short arrows with sharp stones instead of iron for points. Egyptian arrows have also been found, tipped with small arrow-heads of flint, in form much resembling gun-flints. Flint arrow-heads have also been found associated with coins, belonging to the first or second centuries, and in Frankish interments, but whether they were buried as charms, or were in actual use, has not been ascertained. It has been asserted that these stone implements were in use in this country so late as the battle of Hastings, but whoever reads William of Poitier's account of that battle, will find that his words are "Jactant lignis imposita saxa," which seems to imply rather that certain stones were thrown from the end of wooden instruments—than that the stones were used either as spears, arrows, or lances. The principal varieties of arrow-heads are leaf-, and lozenge-shape, and barbed, with or without a central stem. The three forms are shown full size in Nos. 8, 9 and 10. As to the method of their attachment to the stems or shafts, you will see in the Museum various examples from foreign nations; and in Switzerland, there have been found one or two still attached to shafts of wood which have been split in order to receive the piece of flint.

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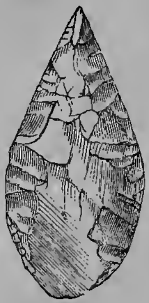
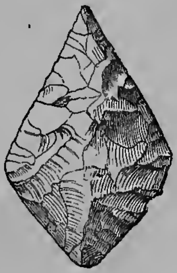
[1] Horæ Ferales, p. 136.

Another form of frequent occurrence found upon the surface of the soil is the so-called scraper—a fragment of flint carefully chipped to a semi-circular outline (like No. 11.) So accurate is the form that one found in Hertfordshire and another in Sussex correspond as the two valves of a shell. The use of these is problematic, but among the Esquimaux exactly similar implements are still in use for scraping skins, they were however probably used also for other purposes.

Other forms of these stone implements are what appear to be borers, punches, and saws, and there are some which perhaps were intended to be used as sling stones. But I confess that the objects regarded as sling stones, seem to me to present an appearance of too much labour upon them, if they were intended to be merely thrown away. At the same time you must bear in mind that among the New Caledonians, stones are carefully fashioned for the purpose of being used with the sling. You will see to-morrow a number of these last mentioned forms of implements, which have been found in the neighbourhood of Andover, exhibited by Mr. Stevens. Similar forms have been found in all parts of the country. In Yorkshire they are abundant; in Sussex, too, they are present in considerable numbers; in Bedfordshire and Devonshire the same; and it only



No. 8.



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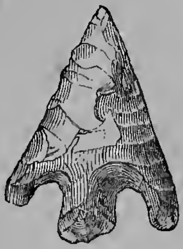

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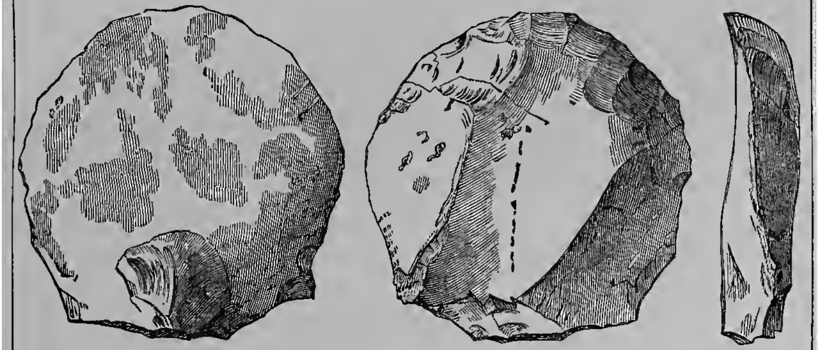

No. 11.

Forms of Stone Implements.

Nos. 8, 9, 10—Leaf-shaped, Lozenge-shaped, and Barbed Arrow-heads. No. 11—Scraper.
All full size.

requires a little skill, and knowledge where to look after them, to form a collection in almost any county in England.

Another form,—the simplest,—is that of the flake, which was frequently used as a knife, and is probably of the same form as the knives used by the Israelites. A flake is simply a splinter of flint skilfully struck off from a block. The mode of doing this may be seen at the gun-flint makers, who are now the principal, if not the only makers of flint implements in this country. A polygonal block is first formed, from the angles of which flakes are dislodged by successive blows of a pointed hammer. By the process employed, flakes or simple knives may be struck off until the block is nearly used up. In all these flakes you can trace the manner in which they have been made, because at the point at which the blow was administered, there is always a certain projection, or bulb of percussion as it is called, showing the place where the hammer was applied. In the ancient knives or flakes we often find traces of their having been used for scraping hard material. We also find the cores or central blocks from which the flakes have been struck. I hold one in my hand, found not in this country, but in the river Indus, so that in India also we have evidence of the same process of manufacture. In the Museum you will see certain large cores from Pressigny in France, from which flakes of ten or twelve inches in length have been dislodged, and in that case the ridge to guide the line of fracture did not result from a single blow, but from a number of blows administered from the sides, so as to form the ridge or projection by cross rather than by vertical action. The same form of flint has been found at Spiennes in Belgium, specimens of which will be seen in the Blackmore Museum. It is also worth while to observe how nearly similar in form, are some of the rude implements which have come from St. Mary Bourne, to those which have been found in Belgium.

I have now given you a general account of the implements which have been found upon the surface, and associated with interments in this country. There are, however, one or two sources of information abroad, to which I must call your attention for a few moments. The first of these are the Kjökkenmöddings, or kitchen refuse heaps of

Denmark, the remains from which are well illustrated in the Museum. On various points of the coast of Denmark, we find heaps partly composed of shells of edible molluscs, partly of bones of animals, mixed with the flint implements of the people to whom they afforded food. You there get these flakes in considerable abundance, as also the cores from which they were struck, and a sort of hatchet peculiar to these heaps, not ground, but formed by merely chipping. The two sides are carefully chipped away, to prevent cutting the string by which they are attached to the handle. These hatchets are not absolutely peculiar to the Kjökkenmöddings, but have been found upon the surface in France, and I have also found one in England. They appear to be a rude substitute for the ordinary stone axe. I shall hardly have time to speak on the degree of civilization exhibited by Kjökkenmöddings, or of their age, on which subject I would refer you to the "Pre-historic Times" of Sir John Lubbock. It appears, however, that ancient as they are, they can be hardly regarded as belonging to a much earlier period than the ground and polished stone implements, for Professor Steenstrup and myself have found in them fragments of polished stone hatchets.

But the most instructive of all places where stone implements are found, are the Lake-dwellings of Switzerland, from which there is a fine collection of relics in the Museum. It would appear that as at Lake Prasias, described by Herodotus, and as in New Guinea in the present day, the inhabitants of Switzerland were in the habit of forming settlements in buildings erected upon piles, at a certain distance from the land. These from accidental causes, were burnt down, carrying almost the whole of the domestic furniture and implements possessed by the occupants, to the bottom of the Lakes, from which they are now being dredged out. We have therefore, there a complete picture of their manner of life, so far as it can be elucidated by the possessions of those people, which have been preserved to the present time. I am speaking now only of those settlements where stone implements alone have been found, and not those of bronze, far less of iron. They had certain domesticated animals, including the cow, pig and goat. They had also certain cereals, which they cultivated for food, such as wheat and barley. They had bread, for even burnt bread has been found at the bottom of the Lakes. They were in the habit of drying and preserving apples, for stores of apples have also been found. They were acquainted with the use of flax, and were able to weave it with a considerable degree of skill, and notwithstanding their unacquaintance with metals, they were certainly as civilized as many of the savage tribes of the present time.

It is however, too late to enter more minutely into the question of the Swiss Lake-dwellings. I will, therefore, merely say a few words with regard to the chronology which may be assigned to the second or neolithic stone period of which this evening I have been speaking. Of course any estimate of the antiquity of stone objects, must, to a certain extent, be regarded as hypothetical.[1] In Denmark there are certain peat bogs, in which are found a succession of forests one over another. There is the beech which prevails at the present time; then the oak and the birch; then lower down layers of pine, and with the pine are associated the stone implements. The oak and the birch are associated with bronze, and calculations having been made as to the period of growth and decay, an approximate idea has been arrived at, as to the ages of the different degrees of civilization, so far as Denmark is concerned. In the same manner, in Switzerland, the deposit formed by the stream of the Tinière, containing three layers of vegetable soil, has been examined by Professor Morlot. In the upper layer, which is four feet in depth, Roman remains have been found. In the layer below, which is ten feet in depth, the remains appear to belong to the bronze period. Below that, at a depth of nineteen feet, there are remains apparently of the stone period. Allowing, therefore, sixteen hundred years for the bed containing the Roman remains, the bed containing the bronze remains may be taken at from three thousand to four thousand years old, that containing the stone remains may be from five thousand to seven thousand years old. M. Gilliéron has formed a calculation from another Lake-dwelling, that of the Lake of Bienne. The Abbey of St. Jean, which was founded about the year 1100, is now three hundred and seventy five metres from the Lake, and assuming that at the time of its foundation it was close to the border, it is calculated that the Lake dwelling, which is situated three thousand metres higher up, must have been in existence at least seven thousand years, that is of course, supposing the process of silting up to have gone on at the same rate. It is evident that to silt up the three thousand metres, seven or eight times the amount of time that has elapsed since the Abbey was founded must have been required. But looking merely to the development of metals, if iron was in use in Europe, as it appears to have been something like one thousand years before Christ, and if bronze was in use for arms for a considerable length of time previous to the existence of iron, we must at all events be carried back some three thousand or four thousand years before Christ, for the existence of the stone period in certain portions of Europe.

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[1] See Lubbock's Pre-historic Times, p. 316.

But I am now getting into a portion of the subject that may be regarded as speculative, and as I promised at the outset to abstain from speculation, I think it is time to conclude. I only hope that I have been able to interest you in that collection which will be thrown open to the public to-morrow, and which you will have an opportunity of seeing this evening; and I am sure you will join with me in feeling that the debt of gratitude we owe to the founders of this Museum, will be best evinced by a proper appreciation of its contents.

Mr. ALDERMAN STEBBING, of Southampton, remarked that during a recent visit to Denmark he found a lithographed sheet distributed amongst the Visitors, giving a list of every kind of implement, which could be ordered, as in England they would order so many boxes of pins or so many brass candlesticks. He thought they ought to view with suspicion anything which came from places where they could have any number of grosses by ordering them a little beforehand; and he thought it was right such a thing should be generally known, when they heard Denmark cited as having such a large number of these things, whilst in England there were so few.

Mr. E. T. STEVENS although perfectly agreeing with Mr. Evans, ventured to observe that it was not always safe to assign any special use to an implement from its form only. He had at this moment in his mind the instance of a fish-hook in the Museum, from the north-west coast of America, the point of which was formed from the plate of a turtle: this point on one occasion came off in his hand, and it presented the exact form of an arrow-head. Had this detatched point reached a collector, it would probably have been classed as an arrow-head. Mr. Stevens further remarked that judging even from the limited series of "scrapers" in the collection, there appeared to be some six or seven well marked varieties, and he had no doubt that in the work which Mr. Evans was shortly to lay before the public, that gentleman would do good service, by arranging this class of tools, and reducing them to order.

Mr. Evans:—I would just say a word or two in reference to the two points which have been mentioned. First, with regard to the abundance of flint implements to be found in Denmark. There is no doubt whatever that they are very much more abundant in Denmark than they are in England; and it is their very abundance there which makes it hardly worth while to forge them, because any one going there and walking about amongst the country people, could often get more in a day than it would be possible to make in the same space of time. With regard to the forms, I perfectly agree with all that Mr. Stevens has said; it is very difficult indeed to say from the form, with certainty, the purposes to which these implements were applied; but in the few remarks that I addressed to you, I was obliged, of course, not to enter too much into detail, though I certainly ought to have cautioned you upon the point to which Mr. Stevens has called attention. In the same manner I may also mention, that there are many flint flakes, the ends of which are rounded like scrapers, and yet in all probability they were not used as scrapers at all. But it seemed hardly worth while to detain you with these minor details, as I merely gave you a general sketch which I hope has been sufficient to interest you in the objects exhibited in the Blackmore Museum.

Earl Nelson:—I am sure you will wish me to express the thanks of the meeting to Mr. Evans for his very able address. Speaking for myself, I may say it was a very interesting address, one which showed the great knowledge which we know he has on the subject, whilst his frequent allusions to classical and other authors showed his great research, and how thoroughly he has studied every part of the subject. I have no doubt that his address (as is very much the intention of the papers this evening), will be the means of attracting attention to this Museum.

Mr. J. W. Flower, F.G.S., of Croydon, then read a paper on "the Quaternary Beds of Salisbury," by Mr. Prestwich, F.R.S., F.G.S., who was himself unable to be present: Mr. Flower said that as the paper was not his own composition, he felt under a great disadvantage in following Mr. Evans, for "when a well graced actor leaves the stage," his successor was not generally listened to with so much attention as he otherwise would be. He was sorry Mr. Prestwich was not there to read it himself, because he would have done much more justice to it than he (Mr. Flower) could do. The paper was as follows.

A SKETCH OF THE

Geology of the Quaternary Deposits at Salisbury.

By Joseph Prestwich, Esq., F.R.S., F.G.S., &c.

WHEN, 60 years ago, the foundations of systematic Geology were laid, it was considered that the divisions into primary, secondary, and tertiary, were sufficient to include all the known strata of the geological series, and to embrace all the epochs of geological time. Since then there have been noticed, scattered over the surface of most countries, irregular beds of gravel, clay, and sand, containing the remains of animals, some of which live in those countries at the present time, and others which are of genera now living elsewhere, as, may be, the Reindeer, or of species everywhere extinct, as the Mammoth, the tichorhine Rhinoceros, etc. Although of very limited thickness, yet from their being so widely spread, but still more from the peculiarity and importance of their organic remains, it has of late been thought desirable to form of these beds a distinct and separate division, now generally known under the name of the Quaternary series. These beds constitute the geological record of the interval between the Tertiary period and present times. One cause of the little attention they so long attracted, attaches necessarily to the conditions under which they were formed, whereby we know them only as local superficial deposits. All the older sedimentary rocks are the result of subaqueous deposition, either under the sea, or in lakes: and their mass usually is considerable and in proportion to the duration of their formation; but these quaternary beds are mere subærial debris strewn on the surface of the land, and the lapse of time is indicated by no thick accumulation of strata. We have merely the wear and weathering of the surface and the debris arising from such wear, left to serve as our measure of time.[1]

During the last few years these quaternary beds have acquired great additional importance in consequence of the discovery in them of the remains of man associated with the remains of the partially extinct Fauna. In this district these beds possess much interest. So far back as the year 1827, Sir Charles Lyell called attention to the ocurrence of fossil bones of the *Elephant, Rhinoceros,* and *Ox,* at Fisherton. In digging the foundations for the gaol, numerous remains of the Rhinoceros especially were found. In the year 1854 I gave a short notice of the gravel and brick earth forming the quaternary beds at Fisherton, and Mr. John Brown of Stanway described twenty-one species of land and fresh-water shells with the remains of a few additional mammalia, which we found in them. Since then Dr. Blackmore has added materially to this list, and the fauna of this deposit is now one of the best and richest in the kingdom, comprising, besides the species just mentioned, the *Cave Lion* or *Tiger, Cave Hyæna, Wolf, Fox, Aurochs, Horse, Hare, Marmot, Lemmings, Red Deer* and *Reindeer,* together with remains of the *Wild Goose* and *Duck,* with fifteen species of land shells and sixteen species of fresh-water shells.

These remains are not scattered uniformly throughout the deposit, but are found chiefly at the bottom of the brick earth, and occasionally scattered in it.

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[1] I am now speaking only of the land and river deposits. They rarely exceed 50 feet in thickness, and are more generally from 10 to 20 feet thick. Contemporaneous submarine deposits were of course going on at the same time, but they still remain hidden at the bottom of the sea, unless we except the Boulder clay and associated beds, which, in the eastern counties and some other parts of the kingdom, have a large development and attain a thickness of several hundred feet. These, however, belong to the earlier part of the Quaternary period, whereas the river drifts of Salisbury belong to the later part of it.

I will not dwell upon the lithological structure of these beds nor upon their organic remains. It would occupy too much of your time. I shall have occasion to refer to both as I speak of the probable origin and mode of formation of these deposits.

I told you that so far as magnitude was concerned, there was little in these deposits to denote any long lapse of time: but we have other phenomena which furnish collateral and independant proof of the time occupied in their formation. That proof exists in the excavation of the valleys which traverse the chalk district of Wiltshire.

To those not acquainted with geology, I would briefly state that valleys are formed in two ways. All sedimentary strata (which constitute the great bulk of the rocks forming the crust of the earth) were deposited under water, were necessarily originally horizontal or nearly so. Therefore where the bed of the ancient seas has been elevated without disturbance, the surface of the newly emerged land has consisted of large plains formed of horizontal strata. But it has often happened that by the irregular action of the elevating subterranean forces, these horizontal strata have been forced and tilted at considerable angles, upon certain lines, into roof-shaped ridges, forming ranges of hills and mountains. Where two such ridges have been elevated parallel to one another, the depression between them has naturally given rise to a valley. The other mode of valley-formation is that where the strata have remained flat and horizontal, and the valleys have been scooped and excavated out of these table lands. In such cases, instead of the strata curving upwards and following the slopes of the hills, the horizontal strata have been cut through, and their truncated edges crop out on the sides of the valleys. This is the structure which prevails in these chalk districts, and in most of the districts in the south of England. The question next arises,—what was the agency which scooped these valleys out of the horizontal strata?—So long ago as the beginning of this century, Dr. Playfair and others referred the origin of such valleys to the action of the rivers; but the power evoked by such an hypotheses appeared inadequate to produce the great results which we witness. It is hardly possible to conceive that existing rivers, however long the time granted, could have sufficed to erode the deep and numerous valleys which we see traversing this district;[1] but since the time of Dr. Playfair, geologists have been led to believe that the higher temperatures which are supposed to have prevailed during the tertiary period, instead of merging gradually into the present climatal conditions, were succeeded by a period during which an intense degree of cold prevailed in these regions—a cold such as is now confined to the polar regions of the earth. This state of things furnishes us with a cause sufficiently general, and possibly sufficiently powerful, to produce the results we now witness. There is evidence to prove that at that time the mountains of Wales and Scotland were covered with perpetual snows, and that innumerable glaciers descended from their sides. In keeping with such a climate, the lower lands were probably covered with snow for many months in the year; and the same consequences would follow as happens now in all the northern and arctic countries, where, during the first weeks of spring the melting of the snow causes the rivers to rise ten, twenty, and even forty feet, flooding extensive tracks of country, deepening the river channels, and spreading over the valleys the debris of the land, together with the remains of animals destroyed by the floods. The weathering of the rocks would also be greatly facilitated by the action of the intense cold tending to fracture and break their exposed surfaces.

We may picture to ourselves, at an early date in the quaternary period, the then nearly level chalk plains of Wiltshire covered with the great accumulations of winter snow, throwing off, in rapid thaws of spring, large bodies of water, which, spreading across and passing swiftly down the then shallow valleys, wore away the chalk surface and strewed over the ground the harder and more indistructable flints derived from the abraded chalk. Each succeeding spring would witness the recurrence of the like phenomenon, and each succeeding year would witness a certain amount of wear and weathering along the whole course of the valley.

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[1] I believe, also, that some other and primary cause gave the first impress to the valleys, and directed the course of drainage for the rain falling on the newly raised land. That the last 100 to 150 feet in depth of those valleys have, however, been excaved by the rivers I have little doubt.

Evidence of this wear and of the higher levels at which the river flowed, exist in many of the localities around this town. You will not of course expect to find the debris brought down by a torrential river scattered uniformly over the bed of that river or over the adjacent banks, but you will find it lodged in places where it would be protected from the action of the current, or where the current ceased to flow with the same rapidity. Thus at the junction of the two valleys of the Wiley and of the Avon, and again of the Avon and Bourne, you will find, on the hills where the old streams met, at a level of some sixty to eighty feet above the present streams, beds of gravel which were deposited in the eddies at the junction of the streams.

That these gravels were brought down by a river flowing in the course taken by the existing rivers, is evident from the nature of the materials of which they are composed. For example all these gravels consist essentially of the fragments of flint derived from the chalk through which the valleys are cut, together with some round flint pebbles from the outliers of tertiary strata occurring in places on the chalk hills, and blocks of hard siliceous sandstone (Sarsen stone), derived from the same source. But in the valley of the Wiley, the gravel also contains fragments of the harder stones, such as the chert of the Greensands, derived from the rocks of the Vale of Wardour, through which the river flows in the upper part of its course. This gravel can be followed at intervals up the valley by Wilton and along the Vale of Wardour,—the debris of the rocks of that district becoming more abundant as we approach the beds in situ. But besides the masses of gravel which were brought down by the torrential action of the old rivers, beds of sand would be deposited where they flowed with less rapidity, whilst in flood-time their muddy waters would deposit on the flanks of the hills, where their course was checked, the fine sediment with which they were charged; the remains of this sediment you have in the brick earths so largely worked and so well known at Fisherton, and up the valley to and beyond Wilton.

I want you to understand that these quaternary beds therefore, although presenting such different conditions,—in one place beds of gravel, in another, beds of sand, in another, beds of brick earth,—all result from one common cause, and are only different phases of one phenomenon, that being the great annual inundations resulting from the melting of the snow, in a district where, at that time, an Arctic climate prevailed.

This view of the subject is not only conformable with the evidence derived from physical structure, but is also in entire agreement with the evidence furnished by the organic remains. Thus we find in the beds of sand associated with the gravels, evidence of fluviatile action like that of the present day, for in those sands and gravels are found the remains of numerous fresh-water shells such as now live in the existing rivers, mixed with some land shells, and occasionally with the bones of animals, either drowned in fording the old rivers, or else swept down by the inundations to which those rivers were subject. Further in the brick-earth, which is merely the sediment deposited during inundations, we find numbers of small land shells now common on the Wiltshire downs, and which must have been swept down at those times in thousands, together with the remains of land animals destroyed by the floods. These small and light shells floating down the flooded rivers, were mostly deposited in the silt or brick-earth, as the waters fell to their lower levels. The river shells remained more in the channel of the river.

The velocity of these rivers during floods may have been sufficient to carry down the gravel produced from the wear and tear of the chalk and other rocks, and possibly to transport some of the blocks of rock, but there are found occasionally mixed up with the gravel so many and often such exceptionally large blocks of Tertiary sandstone, and they so frequently show so little wear and tear (which could not have been the case if rolled far down a stream), that we can only imagine their transport to have been effected by the agency of floating ice, as now takes place yearly in the river St. Lawrence and other northern rivers. We find also that the upper part of these soft beds of sand and silt, are sometimes contorted and twisted, as though by the pressure of some hard substance which has been subsequently removed. This again may be attributed to the action of ice rafts, impinging against the soft sand and gravel, and leaving their impress on the softer substance. At other times the rafts have added to these beds their own loads of sand or gravel.

With regard to the evidence of cold furnished by the organic remains, some very valuable facts bearing on the general question have been brought to light in this particular district. The shells whether of the land or fresh-water, tells us nothing positive. There is merely the negative fact of the absence of forms peculiar to Southern Europe. They are the same species which are found living in all the existing rivers, from France and England to Siberia. The evidence afforded by the land animals is more important and specific. First, we have the Mammoth and tichorhine Rhinoceros, both animals of which the remains are found abundantly in Siberia, and which, from their association and their thick covering of hair and wool, are supposed to have been fitted to live in a cold climate. Besides these we have the remains of the Reindeer, now living in Europe only in the extreme north; and Dr. Blackmore has found, the rare remains of Lemmings and of the Marmot, the former now peculiar to northern and arctic Europe and America, and the latter to the higher and colder mountains of Europe. The other mammalia found with these are such as have a wide geographical range, and are more independent of climatal influence. Even the Tiger frequents during the winter districts in Asia covered for months by snow, and subject to the annual freezing of the large rivers.

A unique and curious addition made to the Quaternary fauna here is that of the portions of two egg-shells found in the brick earth at Fisherton, the one corresponding in size with the egg of the Wild Goose, and the other with that of the Wild Duck. A few bones of the former have also been discovered. Southern England, like the shores of the Arctic seas at present, might then, during the summer months, have been visited by flights of these birds, resorting hither for the breeding season, from the more temperate regions of southern Europe.

This probably will suffice, slight as this sketch is, to shew you how peculiar and strange the conditions were which prevailed during this last Geological period in your district.

The point to which I would now to direct your attention, and upon which you will presently hear some observations by Mr. Evans and others better qualified than myself to speak on the ethnological question, is the occurrence of objects bearing the impress of the work of man in these quaternary beds.

When I visited the celebrated deposits in the valley of the Somme, in which so great a number of flint implements had been found by Boucher de Perthes, I was particularly struck with the close resemblance of the beds at Fisherton with those at Menchecourt, near Abbeville: they were almost identical both in position, appearance, and structure. I hastened therefore on my return from Abbeville, in 1859, with my friend Mr. Evans, to examine the Fisherton beds in search of similar remains of man, but without success.[1]

More careful and long continued search has since been brought to bear on this inquiry, and thanks to the zeal and energy of Dr. Blackmore, Mr. Brown, and Mr. Stevens, the quaternary beds of Salisbury have now yielded a collection of flint implements second to none in this country. As usual they are found in perfectly undisturbed ground, and associated with the remains of the animals which I have before mentioned. It is possible that one cause of their being found in such numbers in these old river gravels, may be owing to the circumstance that the men of that period, not being in possession of the means of quarrying the chalk, resorted to shallows in the river during periods of low water, and, selecting the largest blocks of flint amongst the river shingle, there manufactured the implement on the spot. The worst and broken specimens would be thrown on one side, and further during sudden freshets of the river many would be abandoned and lost.

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[1] It would seem however that side by side with the discovery of Boucher de Perthes (but like several other facts of the like nature remaining dormant for many years such a discovery had actually been made in this district many years previously, but the specimen was put on one side in ignorance of its importance. It is a flint implement of dark colour and of the true quaternary type, and is said to have been discovered about 20 years since in the neighbourhood of Salisbury, but no record of the circumstances under which it was discovered has been preserved. It was given to the late Dr. Woodward of the British Museum, who put it on one side as having little reference to his own special studies: but when the geological element was introduced, and the newly acquired importance of such specimens established, my friend then hunted up this specimen to show it to me. He had merely noted that it was found near Salisbury, but as at that time it would be taken for granted that it had been found either on the surface or in some barrow, and was not supposed to have any unusual interest, it led then to no further investigation.

On the plains of Wiltshire stands a monument, a grand memorial of past races, and still a problem to antiquaries, the origin of which is lost in the mist of pre-historic ages. But however ancient Stonehenge may be, and early the date with respect to our own times, we have in these simple quaternary flint implements, found in the valleys at your own doors, evidence of a race of men, who must have preceded those by whom Stonehenge was built by a period infinitely more prolonged than that which separates these days from those of the builders of Stonehenge. Faint however as are the traces of man in this remote and very differently conditioned time, yet does it seem to us that his reality is little less assured by these smaller works than by the more gigantic and accepted records of the later period. Rude as man was at this latter period, much more so was he at the former period. Hitherto we have been unable to discover that he then possessed any other art than that of forming this one class of objects—these roughly fashioned flint-implements. Not a fragment of any other manufacture has been met with; no pottery, no arrow-heads, no fish-hooks, such as the rudest savages now know how to construct. But it must be remembered that man was then probably scattered sparingly over the land, that he was exposed to great dangers from floods and wild animals, and that his remains and all implements, except those of stone, must have suffered from the destructive effects of time by their exposure to its action for a period so infinitely longer than his remains of the later stone period. Nor must it be forgotten that the discovery of these flint implements is one of very recent date. Let us hope that the active examination of the quaternary beds which is now going on in this country and abroad, may in the course of a few more years add to our collection and throw some further light on this mysterious and interesting subject not only in relation to man and his remains, but also to the climatal, topographical, and zoological conditions of this part of Europe during the period immediately preceding pre-historic times, and the appearance of civilized man.

List of the fossil remains found in the Quaternary beds of gravel, sand, and brick-earth, in the neighbourhood of Salisbury.

- QUADRUPEDS.
  - Species identical with living species.
    - British.....
      - *Fox.*
      - *Hare.*
      - *Horse.*
      - *Ox.*
      - *Red Deer.*
      - *Wild Boar.*
    - Foreign. ..
      - *Aurochs.*
      - *Lemming.*
      - *Marmot.*
      - *Rein-Deer.*
  - Species now extinct. ....
    - *Mammoth, or Woolly Elephant.*
    - *The two-horned Woolly Rhinoceros.*
    - *Cave Lion* or *Tiger.*
    - *Cave Hyæna.*
    - *Ox.*
    - *Horse.*
- BIRDS............................*Goose and Duck.*
- SHELLS.—All of species now living in England.
  - Land Shells...
    - 10 *species of common Snails.*
    - 4 *other small univalves.*
    - 1 *Slug.*
  - Freshwater Shells.
    - 2 *Marsh Snails.*
    - 7 *Univalves.*
    - 5 *Bivalves.*
    - 1 *Freshwater Limpet.*[*]

After the thanks of the meeting had been conveyed by the President to Mr. Flower for so kindly coming forward to read his friend's paper, when he had had no previous opportunity of examining it: and also to Mr. Prestwich for the admirable paper he had prepared, his Lordship enquired whether any gentleman desired to make any observations upon it.

Mr. CUNNINGTON said:—I should like to make one or two remarks upon the subject. Mr. Prestwich is evidently inclined to support the view that the valleys of Wiltshire, in which these flint implements have been found, were produced by the action of rivers, which at that time were much larger and longer than at present. That view I had the pleasure of laying before the Wiltshire Archæological Society in the year 1855, and Mr. Prestwich now supports the view which at that time was taken. There can be little doubt that the sea never interfered with the production of these gravels; that they must have been the work of rivers of greater extent than we can now at all appreciate; that they were the effect of rivers only; and that the fresh-water shells and the flint implements belonging to our forefathers, which the gravels contain, were all accumulated under a condition, not of marine, but of entirely fluviatile action. This is the point which I wish more particularly to bring before the Blackmore Society on the present occasion. I cannot sit down, however, without congratulating the present assembly on the very remarkable collection which is shown us this evening; and I beg to thank those connected with the Museum for the kind way in which we have been received.

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[*] For list of the Land and Freshwater Shells found in the Salisbury Drift, see Dr. Blackmore's paper, Wiltshire Magazine, vol. x., p. 226.

Mr. Flower said:—Perhaps I may be allowed to make one or two observations, because, though I read the paper myself, I dissent from some of the remarks it contains. Mr. Prestwich attributes the origin of the deposits, to the action of existing rivers, or of rivers which flowed in the same course. Now there are many strong and decided objections to that view, none of which he has stated; and this fallacy underlies all his propositions, namely, that all the strata in which we find deposits, were deposited horizontally, and were so left by the sea. Now that, it seems to me, is contrary to all experience, because we know that sea soundings prove that there are submarine valleys and submarine mountains; and it is not to be supposed that when the sea receded from the earth, or the earth emerged from the sea, that they were left in a perfectly level state, as Mr. Prestwich in his paper assumes. There must have been valleys and depressions, and there were forces then in operation of which we have not the slightest examples now. It is quite certain that in any violent convulsion of water, from whatever cause, the surface of the earth would naturally be washed down into the lower valleys and basins. Rain and snow water would follow those depressions, and then would arrive the time at which those depressions would be formed, and these things might then have been uncovered here. And I remember an anecdote of Lord Ellenborough, which perhaps you will allow me to quote. When an indignant suitor once came before him and was about to make a very long speech, he commenced by saying, "My lord, my lord, I protest ————" Lord Ellenborough quietly interposed, "You *have* protested, now go about your business." (Laughter.) I shall follow the suitor's example, and having protested, go about *my* business.

Mr. Evans:—I really don't know that this protest calls for any remarks, but unfortunately, as my friend Mr. Prestwich, is not here to take his part against his friend, I am obliged to say a few words; and first of all I would remark, that I do not see that Mr. Prestwich ever maintains that the surface of the ground on its last emergence from the sea, was absolutely level. What he did say was, that there was some existing depression in the land, which induced the water to flow along a certain course. Moreover, his argument with respect to these beds is founded, not on the absolute depth of the valleys themselves, but on the relative depth of the valleys to the beds containing these implements. He says, for instance, taking the bed of Milford Hill, in which we find a number of land and freshwater shells in the gravel, there is evidence that that gravel was deposited by river action, inasmuch as it contains those shells. And further he says it is not the custom of rivers to deposit their gravels anywhere but at the bottom of their course; and therefore he infers that at the time the gravel on Milford Hill was deposited, Milford Hill was the bottom of a river. If so, it follows of necessity, I may say, that neither the valley on the right hand, nor the valley on the left hand, had been excavated, and therefore that those valleys have been excavated since that time. The amount of excavation of those valleys will give you some idea of the antiquity of the beds on the top of Milford Hill; and when you find, too, as is the case, that the sectional area of the valley on the left hand is smaller than the sectional area of the valley on the right hand, very much in the same proportion as the stream on the left hand is smaller than the stream on the right hand, you have additional evidence that those two valleys were excavated by rivers flowing over the same course as the existing rivers. Mr. Prestwich carefully avoids saying that these rivers flowed under the same conditions as at present; he says they flowed under different conditions, and he therefore abstained from saying how long it took those rivers, under those more active conditions, to excavate those valleys; but he does say, and I believe with perfect justice, that the existing valleys are due to the operation of waters running along the courses of existing rivers, though acting in a more effective manner than the existing rivers do. Now having put in that protest on the part of Mr. Prestwich, I go about my business.

Mr. Flower:—I should be sorry to mis-state Mr. Prestwich's views; but Mr. Prestwich has departed from his ancient faith in this matter, and I attribute this in some degree to Mr. Evans. Mr. Prestwich's words are these:—"To those not acquainted with geology, I would briefly state that valleys are formed in two ways. All sedimentary strata deposited under water, are necessarily horizontal; therefore if the bed of the ancient seas were elevated without disturbance, the surface of the newly emerged land would consist of large plains formed of horizontal strata, but it often happened that by the action of submarine forces these horizontal strata are forced up into ridges of hills and mountains; where two such ridges are elevated parallel to one another the depression between them naturally gives rise to a valley." Now what I said was that we know that the bottom of the sea is not uniformly horizontal, but that there are sub-marine mountains, sub-marine valleys, and sub-marine reefs.

Mr. Moore:—But the beds laid down must necessarily be horizontal.

Mr. Flower:—A mountain would remain a mountain, and a valley a valley.

Mr. Moore:—But these deposits would necessarily be horizontal.

Mr. Flower:—Do I understand you to say that across the Atlantic the beds of the sea are perfectly horizontal?

Mr. Moore:—I should say that the beds being deposited are perfectly horizontal.

Mr. Flower:—Suppose for instance that by some operation of hydrostatics the whole of the water could be drawn off, do you think we should find that the bed of the Atlantic would be perfectly horizontal?

Mr. MOORE:—To a great extent it would; the deposit of the valleys would be to a great extent horizontal.

Mr. FLOWER:—I have only this further observation to make, that this great river which is spoken of by Mr. Prestwich must have had banks,—a place from which it flowed, and a place to which it flowed; but we have not the slightest trace of anything of the kind in many of these beds. We find these deposits at Bournemouth, on the top of the high cliff, and I should like to know where the banks were. There is no trace of a river; there is no high land from which the river flowed, and no banks through which it passed.

A brief paper on "The pre-historic collection in the Paris Exhibition," sent by Augustus W. Franks, Esq., F.R.S., F.S.A., was read by Mr. Evans, and at its close some discussion took place, in which Mr. MOORE, F.G.S., Mr. STEVENS and Mr. BLYTH took part. Thanks were voted to Mr. Evans for reading the paper, and to Mr. Franks for having prepared it.

On the motion of Mr. STEVENS a cordial vote of thanks was also passed to Earl Nelson for his kindness in presiding; and the noble EARL, in acknowledging the compliment, said he was sure all who had attended to what they had heard and all who had seen the collection in the Museum, must have realized more than they did before, what a boon had been conferred upon the people of Salisbury, and the county of Wiltshire. Mr. Blackmore had very kindly brought it to his native city; but although he had established it in Salisbury, in these days, when Salisbury was so generally connected by railways with almost every other place in England, it might really be called a boon to the nation at large.

MEETINGS ON THURSDAY.

On Thursday morning, a numerous company assembled in the Blackmore Museum, under the presidency of the Rev. A. C. SMITH, Rector of Yatesbury, Calne.

The Chairman opened the proceedings by briefly enumerating the titles of the papers which were to be read, and then called, first upon Mr. Moore, for an address,

ON THE PRESENCE OF BUBALUS MOSCHATUS IN THE DRIFT OF WILTSHIRE.

Mr. CHARLES MOORE, F.G.S., said:—I scarcely know why I should have the honour of addressing you, because I have done very little in connection with the special objects for which this Museum has been formed. I have rather been working as a geologist in the endeavour to throw light upon older times than those which are here so splendidly and magnificently represented. But in working in one direction, sometimes, if you keep your eyes open, you may be able to throw light upon matters with which you may not be specially connected; and it is in reference to one of these points that I am about to say a few words to you on the present occasion. The mammalia of the drift, which you see so well represented in this Museum, occur in the immediate neighbourhood of Bath. The Bath basin is to a great extent covered with mammal drift of about 10 feet in thickness, and although very few implements have turned up in that direction, still mammalian remains are in very great abundance, not only in the valleys of the neighbourhood, but as I said before, through the whole district. A curious illustration has lately been met with in the new Cemetery of the parishes of Lyncombe and Widcombe. Geologists, as you know, have been anxious to find man amongst the extinct mammals; and although that point has not here been satisfactorily established up to the present time, yet the time will come when it will be so. In the Bath Cemetery every grave has been sunk through the mammal drift, so that any geologists who may happen to follow us some thousands of years hence will certainly find man amongst the mammals. The drift extends through the Bath valleys, and the Bradford valley more particularly is covered with it. It extended in this direction certainly so far as Bradford. In the workings of the gravel between Freshford and Limpley Stoke some very fine mammalian remains have been found. Of the two specimens of Bubalus Moschatus before you, one was found at Limpley Stoke, and the other comes from the borders of Wiltshire, although it is properly a Somersetshire specimen. One certainly is a true Wiltshire specimen. This animal has been found only in five instances in England. The first specimen was found near Maidenhead; the second, which I have here, between Limpley Stoke and Freshford, the third nearer Bath; the fourth at Bromley, in Kent; and the fifth by Mr. Dawkins, at Crayford. The last specimen is by far the most perfect of the series yet discovered. It is considered by Mr. Dawkins, who has been lately writing on the subject that this creature belongs rather to the sheep than to the ox, and that properly it should be called *Ovibos Moschatus.* In the gravel yielding these specimens, there have also been found remains of Rhinoceros, Cervus, Equus, Bos, and Elephas primigenius. Close by one of the skulls was lying a very fine tusk of the latter, which is now in my museum; so that we have the interesting and curious facts of one animal which is now chiefly confined to the tropics, and of another which is chiefly confined to the arctic circle, living together at the same time in this country; and not only are arctic types represented by the *Ovibos Moschatus,* but in the magnificent museum, the opening of which we are assembled to celebrate, there are the remains of two species of lemming and also of the reindeer, though it is not improbable they may come from a drift later in age than the gravels of the Bradford Valley, in which the former remains were found. Mr. Stevens has been kind enough to furnish me with the recent specimen of Bubalus Moschatus before you, and by comparing the two you will see that they are the same. The horns and cores are quite perfect in the one, but are wanting in the other. On comparing them, however, you will see at once that they are identical. One is the head of the bull: the one I hold in my hand is the head of the female, and is the only specimen of the female which has yet been found in this country. No doubt, however, as attention is now so much directed to these deposits that other remains will be found. Where these specimens have come from, many more may naturally be expected to exist; although it is evident, from the comparative rarity of such remains that the animal was not very abundant in this country. In Germany and Siberia it has also been found. In the frozen gravels of the latter country, elephants' tusks are also very abundant. It has likewise been found in the rein-deer caverns of the south of France.

Ladies and Gentlemen, I have nothing more to say, but one of the specimens before you being a Wiltshire specimen, I thought, perhaps, it might not be uninteresting if I said a few words respecting it.

The CHAIRMAN:—I am sure that everybody in Wiltshire will regard the address delivered by Mr. Moore as most interesting and most satisfactory. We have had, it appears, but five specimens of the musk ox found in England, and it is interesting to know that two of those specimens have been discovered, if not in Wiltshire itself, at least on the very borders of the county. One of the best specimens is certainly Wiltshire. I am sure I am only doing what you wish me to do, in proposing a vote of thanks to Mr. Moore for the excellent address he has given us on this subject. I now beg to call upon Dr. Thurnam to read a paper which he has prepared on the Barrows of Wiltshire.

On the Ancient British Barrows of Wiltshire,

AND THE ADJOINING COUNTIES;

And on the Inferences to be deduced from them.

By JOHN THURNAM, M.D., F.S.A.

I HAVE been honoured, on this auspicious occasion, with a request to make some observations on the results to be deduced from the explorations of the ancient grave-mounds, nowhere so numerous, at least in England, as on Salisbury Plain, and the other downs of our county of Wilts. Many of these monuments of a primeval and archaic past, were explored sixty years ago, by the munificent Sir Richard Colt Hoare, and his coadjutor Mr. Cunnington; and following in their steps—*quanto intervallo*—I have myself within the last ten or twelve years, occasionally sought relaxation in similar examinations.

With scarcely an exception, the *tumuli* of our downs are all to be regarded as pre-Roman, and may therefore be spoken of in a general way as ancient British. When tested however, by their outward form and by their contents, they are divisible into two great classes; viz: *long barrows* and *round barrows,* of which the first-named are the earliest in time.

The *long barrows,* in accordance with the geological character of the districts in which they occur, are either simple tumuli of earth, chalk rubble and flints, as in South Wilts and Dorsetshire; or they contain more or less elaborately built-up chambers, galleries or cists of large stones, as in North Wilts and Gloucestershire. Whether, however, they enclose megalithic chambers or not, the sepulchral deposits are almost invariably found at or near the broad and high end of the tumulus, which is generally directed towards the east. But, what is most important, in no case whatever have the primary interments yielded objects of metal, whether bronze or iron; though in several instances implements or weapons of bone and stone have been found with them. Among the latter are specially to be noticed certain delicate, well chipped arrow-heads of flint, of a leaf-shape; and probably, as at Uley, axe-heads of flint and green-stone, both polished. I therefore think we do not err in attributing this form of tumulus, as it occurs in the south-west of England, to the *neolithic age,* and to a period when the burning of the dead, though not unknown, was not a generally received or favourite method of disposing of their remains.

The *round barrows,* whether simply conoid or bowl-shaped, or of the more elaborate bell or disc forms, are very much more numerous than the long barrows of the same district. They much more frequently cover interments after cremation than by simple inhumation; in the proportion of at least three of the former to one of the latter. As, however, the objects found with the burnt bones, and with the entire skeletons in this class of barrows, do not differ in character, but in addition to implements and weapons of stone, including beautifully barbed arrow-heads of flint, not unfrequently comprise other implements of *bronze,* and also the finer and more decorated sorts of ancient British *fictilia,*—the so-called "drinking cups" and "incense cups"—we may safely conclude that all are of the same *bronze age*, during which, in this part of Britain, cremation, though not the exclusive, was the prevailing mode of interment.

So much for the tumuli; as to which I will only remark that, during the last four or five years, I have been able to explore satisfactorily several of the first class, or long barrows; and that I have observed certain peculiarities in the condition of the skeletons and the form of the skulls, which seem to me of great importance in their right appreciation.

Not to trespass however on the time of this assembly with tedious details, to be found elsewhere; I will content myself by giving a concise summary of the *inferences* which seem fairly deducible from the observed facts, as interpreted by the light of those scanty historical notices which have come down to us.

SUMMARY OF INFERENCES.

I. The skulls from the primary interments in the *long barrows* of Wiltshire and Gloucestershire, and it is believed of south Britain in general, are of a strongly marked dolichocephalic type, having a mean breadth-index of ·71; which is much lower than that of any modern European people. No brachycephalic skull, with a breadth-index of ·80 or upwards, has been obtained from the primeval interments in these barrows. No objects of metal or decorated pottery are known to have been found with these interments, but only those of stone, bone or horn. We therefore refer these long barrows to the *stone period.*

II. The skulls from the primary interments in the *round barrows* of the same districts, and it is believed of south Britain in general, are of more or less brachycephalous proportions, having a mean breadth-index of ·81; much higher than that now found in the population of any part of England and Wales.[1] Objects of bronze, and very rarely of iron, and richly decorated pottery, are often found in them, with or without objects of stone. These round barrows therefore we refer to the *bronze period*, and to that of *bronze and iron transition.*

III. The skulls from secondary interments in the upper strata of the long barrows are in most cases of similar brachycephalous proportions with those from the primary interments in the round barrows. They have, in a few instances, been found in connexion with decorated British pottery, altogether identical with that of the round barrows. They are doubtless the remains of the same people as those by whom the circular barrows were erected; and for all intents and purposes may be regarded as round barrow skulls.

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[1] See Table by Dr, Beddoe. *Mem. Anthrop. Soc.* ii. 350.

IV. It has never been pretended that there is any necessary connexion between long skulls and long barrows, or round skulls and round barrows; and the dolichocephalic people who in this part of England buried in long barrows, may have elsewhere erected circular tumuli over their dead. The important question does not regard the form of their tombs, so much as the sequence of the two peoples in the order of time and civilization. As to this, it is contended that the long heads were the true primeval race; and that they were succeeded by a taller, more powerful, and more civilized people, who gradually extended themselves, and became dominant through a great part, perhaps nearly the whole, of the island.

V. These British *dolichocephali*, or long-heads, are the earliest people whose sepulchral monuments can be shown to remain to us. The exploration of their tombs—the long barrows—show that they buried their dead entire, and almost always without cremation; that they possessed herds of small short-horned oxen—the *Bos longifrons*, or *Bos brachyceros*—that they subsisted largely by the chase of the red-deer and wild boar; that some of their customs were barbarous in the extreme; and in particular, that, if not addicted to anthropophagism, they at least sacrificed many human victims, whose cleft skulls and half-charred bones are found in their tombs.

VI. The brachycephalous people, or round-heads, who buried in the round barrows, were more civilized than the *dolichocephali*; and may be inferred to have brought with them the more common use, if not the first knowledge, of bronze. The exploration of their tombs shows that burning the dead was with them the prevailing and fashionable, though not the exclusive mode of burial; and the appearances are consistent with what we are told of the funerals of the Gauls (their supposed congeners), by Cæsar and Pomponius

Mela. From the same source, or the appearances in their tombs, we should infer that they had advanced from the nomadic, hunting and pastoral condition, to a more settled agricultural stage of culture; and that if they had not altogether abandoned the more barbarous customs of their ancestors, and in particular that of human sacrifice, (which all history tells us was, at one time, everywhere prevalent) they had at least restricted them within narrow limits.

VII. There is no proof, nor is it the least probable, that the brachycephalic extirpated the earlier dolichocephalic people. It is far more likely that they reduced them to slavery, or drove them in part into the interior and western parts of the island. When once reduced to obedience, they may have lived with them on friendly terms, and even mingled with them in domestic relations. In some districts, the *brachycephali* would probably entirely replace the earlier race; whilst in others, the *dolichocephali* would live on under the supremacy of their more powerful neighbours. A mingling of the remains of the two peoples in their later tombs must almost certainly have ensued.

VIII. The two races, whose existence is made known to us by researches in the tumuli, are most naturally identified with the two peoples, strongly contrasted in their manners, whom Cæsar describes in well known passages of the twelfth and fourteenth chapters of the 5th book of his Commentaries.[1] According to this, the round-heads of the bronze period are the same as the agricultural people of the maritime districts, who are said by Cæsar to have migrated from Belgic Gaul; and the long-headed people of the stone period are the ancestors of the pastoral and less civilized tribes of the interior, reputed aboriginal, and who prior to the coming of the others—as to which event there is no certain note of time—must have occupied, and been dominant in the maritime parts, as well as in the interior of the island.

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[1] "Britanniæ pars interior ab iis incolitur, ques natos in insula ipsa, memoria proditum dicunt. Maritima pars ab iis, qui prædæ ac belli inferendi causa ex Belgis transierant; qui omnes fere iis nominibus civitatum appellantur, quibus orti ex civitatibus eo pervenerant, et bello illato ibi remanserunt atque agros colere cœperunt. . . . Ex his omnibus longe sunt humanissimi, qui Cantium incolunt, quæ regio est maritima omnis, neque multum a Gallica differunt consuetudine. Interiores plerique frumenta non serunt, sed lacte et carne vivunt, pellibusque sunt vestiti." (*B.G.*, v., 12, 14). Whilst it is seen that the Belgic tribes near the coast were comparatively civilised agriculturists, the people of the interior were much less cultivated, and still in the hunting and pastoral condition.

IX. The origin and ethnic affinities of these two peoples can only be discussed conjecturally and tentatively, in the present state of science. An often-quoted passage in the *Agricola* of Tacitus seems however to indicate part of the probable solution.[1] The great Roman historian points out, first, the dark complexion and curly hair of the western tribe of the Silures; and, secondly, the similarity of the appearance of the southern Britons to their neighbours in Gaul. And he adduces the very obvious argument, from these differences of physiognomy and appearance, that the Silures were descended from the Iberians of Spain, whilst the southern and south-eastern Britons were derived from the people of the opposite coast of Gaul. As evidence of this last position, Tacitus refers to the similarity of the religion, language, moral and mental temperament of the Britons and Gauls. It is not improbable that in this passage the Silures are named *κατ᾽ἐξοχῆν*, as a principal tribe, and as representative of others not like themselves, confined to the extreme west of the island. By Cæsar, however, who knew nothing of the west of Britain, the Silures would be regarded as *interiores,* just as the regions producing tin were, and termed by him *mediterranei*. The *proximi Gallis* of Tacitus are clearly the same people as those of the *maritima pars* of Cæsar.

X. The geographer Strabo is another important witness for a great difference in the features and personal characteristics of the Iberians and Gauls. In the course of his fourth book, he twice tells us that the Iberians differed entirely in their bodily conformation from the Gauls of both "Celtica" and "Belgica;" who he expressly says participated in the common Gaulish physiognomy.[2]

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[1] Tac. Agric. xi. "Silurum colorati vultus torti plerumque crines (Jornandes adds, 'et nigri,') et posita contra Hispania, Iberos veteres trajecisse easque sedes occupasse, fidem faciunt. Proximi Gallis et similes sunt . . . . . In universum tamen æstimanti Gallos vicinum solum occupasse credibile est."

[2] Strabo, iv., 1, § i.; iv., 2, § i. *Τοὺς δὲ λοιπους Γαλατικὴν μὲν τὴν ὄψιν.*

It is evident, that if we interpret this observation of Strabo's by the light of that first quoted from Tacitus, we must picture the Iberians as a swarthy or *melanous* people, with dark complexion and curly dark hair. They would thus be strongly contrasted with the Gauls; who by the classical writers are uniformly represented as fair or *xanthous*, and moreover as of tall stature. Compared with the Gauls, the Iberians like other southern Europeans, were probably a people of short stature. We derive no light from the remains in the barrows, as to the colour of the hair and the complexion of the people buried in them: but they do enable us to ascertain a difference of stature. The measurement of the skeletons, and especially of the thigh-bones, from the long barrows and the round barrows respectively, clearly demonstrates that the *dolichocephali* of the former, as compared with the *brachycephali* of the latter, were a people of short stature. The mean height, as calculated from the measurement of 52 male skeletons or femora, was about 5 feet 6 inches in the one, and 5 feet 9 inches in the other, the average difference being no less than three inches.

XI. The cranial type of the ancient Iberians has not yet been so conclusively ascertained as is to be desired. But the examination of the large series of skulls of modern Spanish Basques, at Paris, as well as of such Spanish and Portuguese skulls as exist in English and Dutch collections, altogether justifies the presumption that the Iberians of antiquity were a decidedly dolichocephalous people.

XII. The British *brachycephali* of the bronze period are to be regarded as an offshoot, through the Belgic Gauls, from the great brachycephalous stock of central and north-eastern Europe and Asia; in all the countries of which—France, Switzerland, South Germany, Bohemia, Poland, Russia, and Finland—the broad and short cranial type is still the prevailing one.

The earlier British *dolichocephali* of the stone period were, we think, either derived from the ancient Iberians, or from a common source with that people. Not only was Spain peopled by the Iberian race, but even in historical times, a considerable part of Gaul; and there is no improbability in the conclusion of its having occupied the British Islands likewise, as is, indeed, asserted by some ancient historians.[1]

XIII. As to the origin of the Iberians themselves, it is better to confess our ignorance, than to indulge in premature speculations. Some,—as Professor Vogt, would bring them from America, by way of a lost Atlantis, or "connecting land between Florida and our own Continent, which in the middle tertiary (miocene) period, was still above the water." Others, as M. Broca, search for them in Northern Africa; others, in the more or less far East; whilst Professor Huxley finds in their crania, as in those of the other dolichocephali of Western Europe, Australian affinities, though without deciding on "the ethnological value of the osteological resemblance."

XIV. In conclusion, I am content with having established, from archæological and osteological data, at least to my own satisfaction, the existence in this island of the west, of two distinct races in pre-Roman times. One of these, I may repeat, which had lost its supremacy, at least in the south of the island, being the earlier and dolichocephalic, was probably Iberic; the other being the later brachycephalic, was probably Gaulish, or in other words, Belgic.

THE CHAIRMAN:—I am sure that we must all feel deeply indebted to Dr. Thurnam for the interesting paper which he has just read to us. Coming as it has done from such an authority on skulls, we shall feel that what he has said is deserving of the greatest attention. The very fact of the two skulls before us having been found, one in a long barrow, and the other in a round barrow—presuming them to be of a typical character—does appear to me to point out most decisively the existence of different races in this county. One remark, which, I once made before the Archæological Society, I may perhaps be allowed to repeat here, because it has reference to a point on which I do differ a little from Dr. Thurnam. I really cannot think there is sufficient evidence before us to show that the early Britons were addicted to human sacrifice. I am aware that it has been so stated by Cæsar and others, but with the object, as I conceive, of depreciating in the minds of their own people the habits and customs of the nations whom they had conquered. In bringing their armies against the Britons, they were naturally ready to accuse the latter of being addicted to the practices to which Dr. Thurnam has alluded. It is not, however, satisfactorily proved to my mind that the early Britons were either cannibals or addicted to human sacrifice. The fact of skulls having been found in the barrows which had been cloven and knocked about, would seem only to indicate their having been buried after the feuds which prevailed among savage nations. This is an opinion, I may be allowed to say, that is held by others as well as myself, and I have ventured to say so much on this point, because I am desirous that without ample proof, the early Britons should not be set down as cannibals, or as addicted to human sacrifice. I hope that Dr. Thurnam will allow his paper to appear in the *Archæological Magazine,* because discussion in its pages may serve to throw further light upon the subject.

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[1] Dionysius and his paraphraser Priscian, say expressly that the Cassiterides were peopled by the Iberians:—"populos tenuit quas fortis Iberi." [Dion., *Perieg.* v., 563; Priscian, *Perieg.* v., 578.] The Cassiterides are termed by these writers *the Western isles whence tin proceeds*—a mere paraphrase of the word Cassiterides. Under this last designation, as used by the ancients, not only the Scilly Isles, but the Damnonian promontory and coasts were generally included. The very ancient notice of the Cassiterides preserved by Strabo, represents the inhabitants as nomadic and pastoral, clothed in long tunics, covered by *black* mantles; a garb identical with that of the ancient Iberians of Spain, who are likewise described by the geographers, Diodorus and Strabo, as *melanchlæni*, or black robed. [Diod. Sic., lib. v., c. 33; Strabo, lib. iii., c. 3, § 7; c. 5. § 2.]

Mr. E. T. STEVENS :—In the immediate neighbourhood of this city, within the last twelve months, we have opened a number of what we regard as pit dwellings, and I will mention one or two circumstances which may tend to support the observations of Dr. Thurnam with regard to the practice of cannibalism among the Britons. The surface soil of the fields in which these pits exist is largely charged with the ordinary Roman pottery in a fragmentary state, none of which however is found mixed with the material employed for filling in these troglodytic habitations. We infer from this as well as other circumstances, that they were inhabited by a pre-Roman race, or at all events by a people not exposed to Roman influence. It matters little, however, whether the pits were formed before the Romans came to Britain. If the Romans had not influence upon the people, as would appear to be the case from the entire absence of Roman ware in their habitations, it is sufficient for the present purpose. Very few human remains were found in the pit dwellings, although animal bones in large quantities were obtained from them; but what few human remains there were, appear to have been treated in the same way as the animal remains. All the long bones had been broken, as if for the extraction of marrow, precisely as was the case with the mammalian remains. Looking at the scoring of knives upon some of the bones, there is, as far as we can judge, direct evidence of the practice of cannibalism amongst the people who in pre-Roman times lived in these pits close to Salisbury.

Mr. BLYTH :—I remember reading, some months ago, that in the caverns of the south of France human bones were found split in a similar way, apparently for the extraction of marrow.

Rev. E. KELL :—But there is no proof that they had anything to do with human sacrifice.

Dr. THURNAM :—The Belgian caverns have been explored by M. Dupont, whose collection of objects found in them I had an opportunity of inspecting about two months ago. There you will find a considerable number of bones split in the way alluded to. I believe the evidence in favour of that practice is becoming stronger and stronger every day, through the researches which are being made in the caves. All who are in the habit of reading the classical authors, must know that in the history of almost all barbarian and savage people, there has been a period in which man has been killed by his fellow man, and offered as a sacrifice to the gods. There is a curious passage in the work of the Roman geographer Mela, in reference to Gaul. Writing in the reign of Claudius, he says that although human sacrifices had ceased, one thing was still observed in the completion of the religious rites; the human victim was brought to the altar of the god, and blood was abstracted, and with it the altar was sprinkled. Although human sacrifice had been abolished, this reminiscence of it was kept up. Such is the express testimony of the historian Mela, as regards Gaul. The various substitutes for human sacrifice which obtained in Rome and Greece, are known to all readers of the classics. In Greece, when man ceased to be offered, locks of his hair were cut off. The head was not separated, but yet a part of the head was cut off and offered on the altar. In Rome, when the human victim ceased to be thrown into the Tiber, images made of rushes were thrown over, so as to keep up the practice, in a way not offensive to the instincts of civilized man.

Mr. BLYTH :—In the holy festivals of India, people throw red powder upon each other, and that is supposed to be a reminiscence of an ancient sanguinary rite.

THE CHAIRMAN :—Although I believe I am in a minority of one, I am not sorry to have provoked this discussion, inasmuch as it has occasioned many interesting observations from various gentlemen: but I hope I shall not be considered very obstinate if I still maintain that the fact of split bones having been found does not conclusively show that they were split for the purpose of extracting the marrow. I have now to ask Mr. Cunnington to be kind enough to read an interesting paper which has been prepared by Mr. Boyd Dawkins.

Before complying with the request, Mr. CUNNINGTON begged to remark, that the inferences drawn by Dr. Thurnam, in the valuable paper just read were of great importance, more especially as they were the result of so many careful observations. He (Mr. C.) drew attention to the fact, that, as far as we can judge, the dolichocephalic or long-skulled race were very early inhabitants of our island. Many of their tombs, especially in Gloucestershire and North Wilts, consist of chambered structures, formed of large stones. There are many instances where stones, half the size at least of those at Stonehenge, have been erected, and large slabs of stone placed over them to make chambers in which the bodies were deposited. These were afterwards covered with earth, and thus formed the gigantic mounds which are now familiar to us as "long barrows." It is highly interesting to know that the early inhabitants of this island were capable of moving those enormous stones, because it gets rid of one of the difficulties in the way of the belief that ancient Britons were the people who erected Stonehenge and Avebury. Possessing as they undoubtedly did the power and skill to convey and place upon the tombs of their dead such massive stones, may they not fairly be entitled to the credit of engineering skill sufficient for the construction of temples such as Stonehenge, for their religious worship?

On the Pre-Historic Mammalia found Associated with Man in Great Britain.

By W. Boyd Dawkins, M.A., F.R.S., F.G.S.

AT the time man first appeared on the earth, the physical conditions obtaining in Western Europe were altogether different from those under which we now live. Britain formed part of the mainland of Europe, and low fertile plains, covered with the vegetation peculiar to a severe climate, stretched far away into the Atlantic from the present western coast line. The Thames also, instead of flowing into the German Ocean, joined the Elbe and the Rhine in an estuary opening on the North Sea, about the latitude of Berwick. The climate also was very severe, and strongly resembled that of Siberia and North America. One would naturally expect that the animals living on that vast pleistocene continent, under those conditions of life, would differ materially from those now living in what are the mere relics of that continent. Some of them have utterly disappeared from the face of the earth, such as the sabre-toothed lion, the cave bear, the Irish elk, the mammoth, *elephas antiquus*, the woolly rhinoceros, and the rhinoceros leptorhinus of Owen. Others again have departed to northern regions, such as the glutton, the reindeer, the true elk, the musk sheep, the pouched marmot, and the lemming; while others again, such as the cave lion and cave hyæna have retired southwards, and taken refuge, the one in Africa, the other in that continent and Asia. The history of all these animals and of the race of men associated with them, is to a certain extent familiar to most of you; the subject, therefore, that I have to bring before you, relates to the animals which lived from the disappearance of the post glacial mammals, down to the times of history—a period of u tain length, to be reckoned possibly by centuries and possibl tens of thousands of years.

The human remains found in Britain, and belonging to stone and bronze folk, have been diligently looked after by archæologists and craniologists, but the remains of the ani diligently sought after in Switzerland and Denmark, have the most part either been overlooked in this country or confo ed with the animals of the preceding epoch. They have derived from villages and tumuli of unknown antiquity, from r heaps, and from caverns which were at once the abodes burial-places of some early race of man. For this group of anir and those from alluvia and peat-bogs, I have proposed the term historic, because they came into being at a time far beyond the of the historian, some of them also long after the close of the glacial era. Unfortunately I cannot separate those belongin the stone folk from those living in the bronze age in Britain. remains found in tumuli and villages will be first considered. 1862, I had the opportunity of examining the remains at Stanl a small hamlet in Berkshire. They were found in and around circular depressions and trenches which mark the site of a vill probably of Keltic age. They consisted of large quantities of bones, teeth, and skulls of animals that had been used for food; as *bos longifrons* in great abundance, the sheep or goat, the h red deer, pig, and there were also the dog, cat, and martin. metacarpal of a roe deer had been polished, and exhibited the m of friction by a string. Along with them were large quantiti flint-flakes, rudely-chipped lumps of flint, and coarse pottery ashes. There was nothing found to stamp the absolute date of village, but it probably may have been inhabited at the time of Norman invasion. In the tumuli of Wiltshire the same gro animals has been met with by Dr. Thurnam, with the exceptio the cat and martin. In the same county also, the skull of urus been found underneath a tumulus near Calne, associated with rem of the deer and wild boar, and fragments of pottery orname with right lines. It is remarkable as the only authenticated inst of the occurrence of the animal with the remains of man in prehistoric times in Britain.—

Mr. Cunnington here paused in the reading of the paper and said:—"this is an error for which I fear I am partly responsible. Mr. Boyd Dawkins is probably misled as to the occurrence of this animal associated with human remains, by a statement which I made some years ago in the *Wiltshire Magazine,* vol. iv., p. 139. The remains of the urus to which he alludes as having been found in a barrow, were not, in reality, so found. I derived my information from the late Mr. Serjeant Merewether, who told me that the late Bishop of Salisbury concurred with him in opinion, that these horns and the bones found with them "were the remains of a sacrifice made by the occupiers of Oldbury Camp, on the hill immediately above." In 1857, I visited Cherhill in company with Mr. Prestwich, and then ascertained that the remains were found in a bed of local drift close to the rivulet which flows through the valley, round the foot of Oldbury hill. Several men were employed in trenching the ground on this occasion, one of them being a labourer who was working on the spot when the horns were found in 1833. The subsoil proved to be a drift of chalky material, resting on Upper Green-sand. There was no evidence that there had ever been a barrow on or near the spot, and the labourers stated that they saw nothing of the kind when the former excavation was made This opinion is supported by Mr. Sotheron Estcourt, who, in a letter addressed to me on the 20th June, 1859, says "the statement that the horns were found in a British barrow, I believe to be entirely incorrect." I would further remark, in reference to certain fragments of pottery said to have been found with these horns, that they are probably of great antiquity, but they appear to have been rolled by the action of the rivulet. They are certainly not in the condition of pottery as it is usually found in barrows. The horns, which are very fine, are now in the possession of the Wiltshire Archæological Society, at Devizes." The reading of the paper was then continued.—

A vast number of bones have been dredged out of the Thames near Kew-bridge, along with polished stone axes and bronze swords. Their condition proves them to have belonged to animals that were eaten for food—the horse, *bos longifrons*, pig, sh goat, red deer, and roe deer. There were dredged up also v them several skulls that had been gashed and partially cleft, Roman horse trappings. The river at Kew is shallow, when we take the number of bronze swords into considerat some of them even with the metallic end of the scabbard stil the blade, the human skull, and the Roman phaleræ, it is v probable that it was the site of a battle between the Kelts and Roman legions. All that can be said with reference to the dat the accumulation of bones is, that it was probably anterior to time of the Romans. A little higher up the river near the ı water-works, a similar deposit of bones was discovered in the ginning of the year 1867. I found on examination that large oa piles had been driven into the gravel which anciently formed bottom of the Thames, and that a quantity of brushwood, princip of willow, had been pressed in between them; on the top w large quantity of bones, broken more or less for food, and belong principally to *bos longifrons*; the whole was covered with alluv from four to five feet in thickness. It is very probable in this that the piles are the remains of dwellings somewhat similar to th in the Swiss lakes; there were, however, no fragments of pottery, no implements, the only human remains being some of the long bo

We will now pass on to the consideration of the pre-hist caverns in Britain, which have afforded traces of the abode of m In 1859 I explored a small cave at the head of Cheddar Pass Somersetshire; the mammalia found in it consisted of the wolf, badger, wild boar, goat, roebuck, *bos longifrons*, and horse; a hu skull also from this cave is preserved in the Oxford Museum, wh is very well developed, and may have belonged to a person of c siderable capacity. During the exploration of caverns in Somer shire by Mr. Sanford and myself, in 1863, a second cavern of historic age came before our notice, also in the mountain lime-st of the Mendip range in Burrington Combe, about twelve m from Bristol. It was situated high up in the ravine, and was v nearly blocked up with earth mingled with charcoal. It contai a large quantity of the remains of *bos longifrons*, red deer, g wolf, fox, badger, and hare. In the lower portion of the cave we disinterred fragments of a rude urn, of the coarsest black ware, devoid of ornament, and with the rim turned at right angles, together with a piece of bent iron, which more closely resembles those found strengthening the angles of wooden chests in Roman graves on the banks of the Somme than anything else we have seen. The accumulation of bones and charcoal prove that the cave was inhabited by man for some considerable time. The interment is clearly of a later date than the occupation, because it is made in the mass of earth, bones, and charcoal, which resulted from the latter. The interval between the two is of doubtful length. In the same year we explored another cavern in the same ravine, which consisted of two large chambers, connected together by two passages not more than a few inches high. The natural entrance, but a little larger than a fox hole, was in the roof of the first chamber, and through this we had to let ourselves down into the cave. Subsequently we blasted a second entrance. The first chamber was at least half full of broken rocks, covered with a mortar-like mass of decomposing stagalmite. Underneath them was a group of four skulls, one of which belonged to the *bos longifrons*; two others were those of a species of the goat tribe, approaching more closely to the *ægoceros caucasia* of Asia than any other recent species, in the oval section of the horn-cores, in their parallelism to one another, and their slight backward curvature. We have met with a similar form in a refuse heap in Richmond, in Yorkshire, and in the disturbed soil on which London stands, and M. Lartét writes me that he has detected it in a cave in the Pyrenees. In the absence, however, of the necessary materials for comparison from the Museums of London, Oxford, and Paris, I do not feel justified in proposing a new specific name. The fourth skull belonged to the pig, and had a round hole in the frontals, rather larger than a florin, which had the appearance of being made by human hands. The presence of the lower jaws with the skulls indicates that they were deposited in the cavern while the ligments still bound them together. The outer chamber was remarkable for the absence of earth of any kind, except underneath the hole in the roof, where there was a very little; while the inner one, running in the same slope, has its lower end entirely blo up by a fine red earth, deposited by a stream which flows du heavy rains. Between the stones on the floor were numerous b and teeth of wolf, fox, mole, arvicolæ, badger, rat, along with a n carpal of red deer and the remains of birds. How the an remains were introduced, for they exhibit no marks of gnaw and there are no fragments of charcoal in the cave, or any c traces of man, is altogether a matter of conjecture. But the fa finding the skulls in one group, coupled with the presence of hole in the frontal of the pig, leads us to believe that they been introduced by the hand of man. The entrance was fa small to admit of an ox falling into the cave by accident, and sca large enough for a goat or deer to squeeze themselves through; they been brought in by wolf or fox, they would have exhil marks of teeth.

In 1863, Mr. James Parker explored a cave in the lime-h cliffs at Uphill, near Weston-super-Mare, and obtained hu skulls and bones, along with rude pottery and charcoal. I determined the presence of the following animals;—The wild wolf, fox, badger, *bos longifrons*, pig, red deer, dog, and water- most of the remains belong to young animals, and some are gna by dogs, wolves, or foxes. The Heatheryburn cave, in Yorks explored by Mr. John Elliott, in 1862, yielded, besides the rem of man, those of the otter, badger, goat, roe-deer, hog, and wa rat. I have chosen these caverns as representing the pre-his fauna of Great Britain. I might have quoted others, such as Ke hole, which, having been opened during pleistocene and pre-his times, contains the animals that were then alive, the former lower level than the latter; or the Paviland cave, described by Buckland, in which the remains of both periods were mixed have, however, given a sufficient number of examples to prove very different the pre-historic was from the post-glacial fauna.

These pre-historic mammalia, associated with the remain man, are also found along with others in the peat bogs, so by putting the two groups together we can form an adequate of the entire group of animals that inhabited Britain, from disappearance of the post-glacial mammals down to the time of the Roman invasion.

The correspondence of the animals found with man, with those taken from the peat-bogs and alluvia, and from certain of the more modern caverns, prove that, geologically, they belong to the pre-historic epoch. The cave bear, cave lion, and cave hyæna, had vanished away, along with the whole group of pachyderms. and of all the extinct animals, but one, the Irish elk, was still surviving. This animal, indeed, is much rarer in England than in Ireland, in which latter country it seems to have lingered after its extinction in the former. According to some of the Irish savants it was destroyed by the hand of man. The rein-deer still lived on, and proves that the pre-historic climate was more severe in Britain than that under which we now live. As the pre-historic is remarkable for the absence of many of the animals of the preceding period, so it is characterised by the presence of others of a totally distinct character. The sheep, the goat, and the *bos longifrons* appear for the first time, they are widely spread through and highly characteristic of all the deposits. With reference to the latter of these animals, I am obliged to differ from the views of Professor Owen, who considers that it is also of post-glacial age. An analysis, however, of all the evidence that there is upon the subject, compels me to believe that the animal has not yet been found in any deposit of that age in Britain. Before the invasion by the Romans it was kept in great herds by the pre-historic folk, and is found universally in their tumuli and places of habitation. During the Roman occupation it was not supplanted by any other breed of oxen, as Professor Owen suggests, for its broken bones, teeth, and horn-cores, in the refuse heaps of every Roman town and station in Britain, prove that it alone of the oxen was the food of the provincials. On the landing of the Saxons it disappeared from the portion of the country conquered by them, and lives now in the smaller breeds of Wales and Scotland, where the Romanized Kelts took refuge. About that time, also, it was supplanted by a larger breed, probably brought over from Friesland, the home of the Saxon invader. Whence the sheep, and goat, and *bos longifrons* came, is a question I will not dare to enter upon, but all of them appear simultaneously in Britain, and all are assoc with man. It seems to be highly probable that they were introd by him into our island. The true elk was very rare, and has le remains only in one place, in Newcastle, in a subturbary de The red deer had vastly increased in numbers since the post-gl epoch, and very nearly replaced the reindeer. Its remains, how show the effect that a more limited range had on the develop of the antlers. In post-glacial times, while England formed of the mainland of Europe, they were very large; in pre-his times, after Britain became insulated, they were smaller. A dec of size is also noticed in those used for food in the times o Romans, while a minimum is reached in those which are now li in certain restricted parts of England and Scotland. The wolf an were very abundant, but the brown bear was by no means com

We will now pass on to the comparison of the pre-his animals with those living in Britain at the time it was subje the Roman power, and with those which are living at the present The Irish elk, the reindeer, and the true elk have disappeared Britain before the landing of the Roman Legions; with t exceptions all the animals still lived on. To the Romans we probably indebted for a new species of deer—the fallow deer—f has never been found in any post-glacial or pre-historic dep while in refuse heaps of Roman age it is by no means uncommon. all events, its presence in Britain dates from the arrival of the mans. After this time, in proportion as civilization encroached on haunts of the wild animals, they disappeared one by one from be the face of man. The last historical notice we have of the beav that afforded by Geraldus Cambrensis in the year 1188, whe met with it in the river Teivy, in Cardiganshire, on his tour thro Wales to collect volunteers for the first crusade. The brown became extinct in the year 1057, if there be any truth in a leg of the Gordon family in Scotland. The wolf which was sufficie abundant in Sussex to eat up the corpses of the Saxons, left on field of Hastings by Duke William,

"Vermibus atque lupis avibus canibusque voranda
Deserit Anglorum corpora strata solo."

lingered on in England until 1306, in Scotland until 1680, and in Ireland, protected by the uncultivated wilds and the misrule of the country, until the year 1710.

In this outline of the pre-historic animals associated with man, I have attempted to prove that the animals of the neolithic and bronze ages in Britain are identical with those found in peat bogs and alluvia, and that the whole group so constituted differs totally from the post-glacial group of animals; and I have striven to show their relation to the animals now living in Britain. Their comparison with the pre-historic fauna of the Swiss Lakes, or that of Scandinavia, Germany, France, or Italy, I must leave to the savants of those countries. The modification of that fauna I have shown to be the result of man's influence, and I cannot help believing that the disappearance of the larger animals associated with man in post-glacial times, is in a measure owing to the same cause, as well as to climatal or geographical change. With the larger carnivores man must have waged a war of extermination, while the larger ruminants on which he fed must have found the difficulty of concealment increase in proportion to their size. There is a great gulf fixed, so to speak, representing an inconceivable length of time, between the post-glacial and pre-historic periods; and the fauna of Europe, as we have it now, dates from the latter epoch. In Britain, of course, insulated from the mainland of Europe, several animals, probably introduced into Europe after that insulation, have not been found, such as the chamois and bouquetin. Had Britain been united to France during the reindeer epoch, we might have expected to find the remains of those animals.

The CHAIRMAN:—I am sure we owe a debt of gratitude to Mr. Cunnington for reading this valuable paper of Mr. Dawkins. It could not have been put into better hands, for Mr. Cunnington is, perhaps, as familiar with the subject as anybody in this room. I am sure you will wish me to convey our thanks to Mr. Dawkins for preparing the paper, and to Mr. Cunnington for reading it.

The CHAIRMAN then announced that the business of the morning meeting was concluded: and a vote of thanks to the Chairman, moved by Mr. Evans, terminated this portion of the proceedings.

Formal Opening of the Blackmore Muse

THE formal opening of the Blackmore Museum took p shortly after two o'clock, on Thursday, by which ti numerous and select company had assembled. At the entran the building, the Mayor and Corporation the Lord Bishop, County and Borough Members, the Town Clerk, the Deputa from various kindred Societies, and other gentlemen composing procession, were received and welcomed by Mr. William Blackn who, as soon as all had taken their places, said the first duty had to perform was to select a Chairman; and he felt assured he should only be giving utterance to the unanimous wish of t present in asking the Lord Bishop of the Diocese, the Presi of the Salisbury and South Wilts Museum, to preside ove meeting.

The MAYOR OF SALISBURY seconded the proposition, which carried by acclamation; and the Right Rev. Prelate, having t the chair, asked Mr. Blackmore to be kind enough to state the cumstances under which they had met.

Mr. W. BLACKMORE, who was loudly applauded, delivered following address:—

My Lords, Mr. Mayor, ladies and gentlemen,—The time has arrived when this Museum, commenced nearly four years ago, been so far completed that I am enabled, in fulfilment of my orig intention, and in accordance with the rules inscribed on these v —which rules were some time since accepted and adopted fo government by the Salisbury and South Wilts Museum—to tra its future management to you, my Lord, as the President, and to you Mr. Mayor, as well as to the other vice-Presidents and m bers forming the committee of the Salisbury and South V Museum. Much yet remains to be done, both as regards arra ment, and more particularly in the preparation of a catalogue of the collection, without which no Museum is complete; but, although the Museum is still very far from what I hope and expect it may ultimately become, I have felt it unnecessary to delay any longer its opening to the public. And in thus throwing open the collection which you see around you, and which consists principally of the earliest works of pre-historic man, illustrated by modern examples, I shall probably be expected to give a brief account of the circumstances under which the collection has been acquired, as well as my object in placing it here for the free use of the public. Whilst in the United States, towards the end of the year 1863, I was desirous of examining the antiquities which had been exhumed, from the gigantic mounds in the valley of the Mississippi, with the view of comparing them with the objects discovered in the tumuli scattered so plentifully over our own Wiltshire downs. You are doubtless aware that the best known and the most important collection of the antiquities of the United States was that formed by my American friends, Mr. E. G. Squier and Dr. Davis, which have been fully described by them in the first volume of the "Smithsonian Contributions to Knowledge," under the title of "The Ancient Monuments of the Mississippi Valley." After many fruitless endeavours to discover these gentlemen—Mr. Squier being at that time in Peru, whilst Dr. Davis was in one of the Western States—I had the good fortune to meet the latter at New York, in January, 1864, shortly before I left for England. I found from Dr. Davis that his collection was then in the cellars of the New York Historical Society; that it had been under offer to the Society for three years; and that the latter declined to give Dr. Davis the price he asked, although the sum was considerably less than half what Dr. Davis had expended in carrying out his researches, and in exploring the mounds of his native country. Desiring, if possible, to secure such a valuable collection of antiquities for England, I wrote to Dr. Davis, informing him that whilst I considered that these interesting remains of the early inhabitants of the country ought to remain in the United States, yet, if the New York Historical Society still declined to become the purchasers at the price he had fixed, I would willingly do so. Upon this, Dr. Davis notified to the New York Hist Society, that, unless his offer was accepted within a limited the collection would be withdrawn; and the society having fai accept his offer, Dr. Davis, on the expiration of the notice, sol collection to me. At this time, and even for a short period my return to England, I was undecided as to the future destin of these antiquities. I felt that the British Museum had, per the greatest claim to become the possessors of one of the mos portant collections of American antiquities which had been br to Europe; whilst on the other hand some of my Liverpool fr proposed to purchase the collection by subscription, and to pl in the Museum which had been then recently erected in that through the munificence of the late Sir William Brown. deposit of the collection at Liverpool, connected as that town its trade with the United States, would probably have been appropriate; but the natural desire of benefiting my native encouraged by my brothers, and my brother-in-law, Mr. Ed T. Stevens, prevailed over the rival claims of the British Mu and Liverpool, and I finally decided to place the collecti Salisbury. The Squier and Davis Collection, however, as yo forms but a small portion of the contents of this Museum; n theless it constituted the nucleus of the collection. Whils present building was in course of erection, we gathered fro quarters—from the drift-beds of England and the gravel-p Amiens and Abbeville—from the bottoms of Swiss lakes an caves of southern France—from the shell-mounds of Denmar the peat-bogs of Ireland—the earliest known works of man, ar have sought to explain the probable use of these ancient object the actual status and condition of primitive man, by exhibitin plements and ornaments of modern savages, thus enabling th dent to institute a comparison between them. And now f *objects* of this Museum. The chief object I have in view increase of knowledge. Increased knowledge will bring g happiness, a higher state of civilization, a firmer and deeper fa the truths of religion. There have been times when scienc regarded as fraught with danger, and as having a tenden unsettle a man's religious beliefs. Now, however, I trust all feel assured

> "That he is the freeman, whom the *Truth* makes free,
> And all are slaves beside."

There is not, and cannot be, any real antagonism between science and religion; but, on the contrary, the two are in strict union—the former is the helpmate of the latter. Sometimes we may be unable to perceive the harmony existing between them, but this arises, not because there is any collision or discord, but from our imperfect knowledge—

> "All discord, harmony not understood;
> All partial evil, universal good."

And here, my Lord President, I may venture to remind those who were present at the inauguration of the parent Museum, of the testimony which you then bore to the harmony existing between physical science and that science which refers to God, and the relations of man to Him. I cannot do better than quote your own words on that interesting occasion, when you recorded your convictions as follows:—"I am one of those who believe that every manifestation we have of God, and every further revelation of Him, is in entire harmony, and that a well-instructed mind can trace that harmony with all the discoveries which we can make of Him in nature and in man." Nothing, I believe, has a greater tendency to encourage a taste for knowledge and science than our local museums. Professor Edward Forbes, when lecturing "On the Educational Uses of Museums," in 1853, said:—"It is to the development of the provincial museums that I believe we must look in future for the extension of intellectual pursuits throughout the land;" whilst he concluded:—"I cannot help hoping that the time will come when every British town, even of moderate size, will be able to boast of possessing public institutions for the education and instruction of its adults as well as its youthful and childish population—when it shall have a well-organized museum, wherein collections of natural bodies shall be displayed, not with regard to show or curiosity, but according to the illustration of the analogies and affinities of organized and unorganized objects, so that the visitor ma glance, learn something of the laws of nature—wherein the p of the surrounding district, animate and inanimate, shall be s fically marshalled, and their industrial applications careful suggestively illustrated—wherein the memorials of the his the neighbouring province, and the races that have peopled i be reverently assembled and learnedly yet popularly expla The knowledge of the intellectual requirements of the age i the late Dr. Fowler to provide this city with a building which the receptacle of our local antiquities, in which the stude examine the geology and the natural history of the district; in this Museum he will, for the future have an opportu becoming acquainted with those relics of the stone age which all we know of the earliest inhabitants of our own and other tries. The number of visitors to the Salisbury and South Museum affords the best and most convincing proof—if an wanted—not only the necessity of such an institution in thi but also of keen appreciation by the citizens themselves opportunites thus afforded them for intellectual recreation a provement. Another object which I have had prominently i in founding this Museum, has been the cultivation of friendl tions between the scientific men of all countries—and I hav especially desirous of promoting greater cordiality between the of this country and those of the United States. I have pre told you that this Museum owes its origin to the visit which I to the United States, at a time when that country was invol the throes and miseries of the great civil war. The North that time much exasperated against England; and I then r that, if I could in any degree, however humble, encourag friendly feelings between the people of the two countries, I do so. And I now most sincerely trust that the care ta England, in the preservation and free exhibition to the pu some of the earliest and most interesting of the antiquities United States, will be an additional link and bond of union b the two great families of the Anglo-Saxon race, whose des appears to be to dominate and civilize the whole earth. A third less weighty motive in the establishment of this Museum, has been the benefit of my native city, more particularly by giving increased means of study to the young men of Salisbury. This last object will, I feel assured, so commend itself to you as to obviate the necessity of any further remarks. I may mention, however, that I hope, at a future day, to supplement the Museum by the addition of a library of books of reference connected with and illustrative of its contents And now, having given you an outline of the origin of the Museum, and having stated some of my objects in founding it, I ask your attention for a few minutes whilst we take a hasty glance at Priscan archæology. I have told you that this collection contains some of the earliest records of the human race. When we look beyond the chronicles of our own isle, and turn to the early history of either Rome, Greece, or Egypt, the mind experiences difficulty in realising the lapse of time which has taken place, even since Tarquin laid the foundations of the Capitol, Socrates taught in the groves of Athens, or Cheops built the Great Pyramid. But these times—far distant as they are from our day—are but as yesterday when contrasted with the early dawn of man on the earth. The Etruscans preceded the Romans, and were regarded by them as an ancient people; and yet, in the deposits lying many feet below the graves of Eturia, we find human-worked flints and remains of a still earlier race. Underneath the foundations of the Acropolis at Athens, and below the chief corner-stone of the great temple of Khorsabad, flint implements have been discovered; while the alluvial deposits of the Nile—deposits made annually with such regularity and certainty that there is no doubt as to the effluxion of time which has taken place—yield at their greatest depths records of the pre-historic inhabitants of Egypt. But we learn also by the aid of comparative anatomy, that the fauna of our own county was then vastly different from what it now is, and the primal inhabitant of our valleys, clad perchance in skins, and with but a rude flint implement as his weapon, may have had to contend for his life with the great hairy-mammoth, the woolly-rhinoceros, or the huge cave-lion, which were then the denizens of this district. Taking the description of our county as given by my brother, Dr. Blackmore, "Our peaceful downs, could they speak, would tell of vast droves of rather small but hardy horses, not unlike the half-wild forest ponies of the present day; of the dainty browsing of whole herds of deer; of a small short-horned ox, and a shaggy-maned bison; of the stillness of the night, broken by the terror-inspiring roar of a hungry lion, or, perchance, the hideous discord of a pack of savage hyænas, quarrelling over some half putrid carcass of a young rhinoceros, making the air re-echo with their peculiar yells—that strange, half-human expression of savageness and mirth; of winters of intense cold, when even the hardy reindeer and musk buffalo found it difficult to procure food sufficient to support life, and gladly availed themselves of the miniature stacks of hay collected in the summer by the provident little marmots." And the primitive inhabitant himself; how vastly different both in body and mind, from the civilized man of the present day! Man such as this lived in no Golden Age, or Arcadia. Elevated but one degree above the brute-beasts of the field which surrounded him, he dwelt, like them in caves, grovelling amidst dirt, squalor, and putrescent animal remains; probably without clothing, or at best but scantily protected from the inclemency of the weather by an untanned skin; begrimed with a coating of clay or mud; without cooking utensils; his weapons and implements restricted to a club, stone axe, flint scraper, or possibly a pointed bone; at times gorged to repletion after a half-raw banquet, when the chase had proved successful; at other times starving, until impelled by the cravings of hunger, he satisfied his appetite, like the brutish Fuegian, with the remains of his murdered mother or child, in lieu of sacrificing his more useful dog. Like the wild animals—ever suspicious, always on the watch, never out of danger, depending on no one—his life was a prolonged scene of utter selfishness and fear; whilst his religion—such as it was—so far from satisfying the natural aspirations of the soul, and being a comfort and consolation to him, but served to people his spiritual world with nothing but a malignant Evil Being. The rude stone tools and weapons found in our drift gravels and in our caves teach us what was the probable condition of the earlier inhabitants of these islands; and comparing the *past* with the *present,* what a vast growth in civilization has taken place. Time will not permit me to discuss the difference of type and the distinctive characteristics of the objects found, in the drift, in the caves of the reindeer period of France, in the kitchen-middens of Denmark or on the sites of the lake-dwellings of Switzerland, which matters will be far more ably explained by others; but I venture to impress on you the great lesson, which, as I conceive, is taught by these remains, namely, that of *progress*—of a very gradual but sure growth from a condition excessively rude to a more finished and more perfect state of civilization. Each step has been gradual, but when an improvement in any domestic and useful art has taken place, it does not appear either to have been forgotten or to have disappeared, until, in its turn, it was superseded by a better device. The stone weapon, we find, was at first only chipped, as in the rude specimens from the drift; then it was rubbed at the edges, in order to increase its cutting power; until at length the perfection of finish was attained in the highly polished and exquisitely shaped specimens, such as those found in the dolmens of Brittany. I do not ask you to confine yourselves to the evidence of gradual progress which is thus afforded, I would rather invite you to contrast the far distant *past* with the *present*. The wattle dwelling of the savage has been succeeded by such stately and elegant buildings as our cathedral; the unwieldy "dug-out" and the fragile canoe has been replaced by vessels like the iron-clad Warrior, or the swift Cunard steamer; the flint-tipped arrow and the stone hatchet have been superseded by those deadly weapons of modern warfare, the breech-loading rifle and the gigantic Armstrong gun. This progress in the *past* is our surest and best guarantee of the growth of civilization in the *future*. The triumphs of science assure us that we may confidently reckon on a still greater improvement in the condition of man. The present sanitary condition of our own city is happily one of the most striking modern instances of the decrease of disease and mortality, arising from a greater knowledge of and attention to the laws of health. A better supply of water, and an efficient system of drainage, have converted Salisbury from one of the most unhealthy into one of the healthiest towns in England; so that during the twelve years which have elapsed since these changes were made, upwards of 800 people, who might otherwise have fallen victims to bad drainage, have had their lives saved through these improvements. "In reality," to use the words of Sir John Lubbock, whose absence to day all must regret, "we are but on the threshold of civilisation. Far from showing an indication of having come to an end, the tendency to improvement seems latterly to have proceeded with augmented impetus and accellerated rapidity. Why then should we suppose that it must now cease? Man has scarcely yet reached the limits of his intellectual development, and it is certain that he has not exhausted the infinite capabilities of nature. There are many things which are not, as yet, dreamt of in our philosophy; many discoveries which will immortalise those who make them, and confer upon the human race advantages which as yet, perhaps, we are not in a condition to appreciate. The future happiness of our race, which poets hardly ventured to hope for, science boldly predicts. Utopia, which we have long looked upon as synonymous with an evident impossibility, which we ungratefully regarded as too good to be true, turns out, on the contrary, to be the necessary consequence of natural laws; and on every side we find that the simple truth exceeds the most brilliant imagination."

My thanks are due to many who have kindly assisted in the establishment of this Museum, and more especially to those eminent and distinguished men who have honoured us by becoming Associates, and who have aided as well by their advice and literary contributions, as by the additions they have made to the collection. We are in this respect under great obligations to my friends, Mr. John Evans, Mr. Joseph Mayer, Mr. George Witt, and Mr. J. W. Flower; while we have been on the most cordial terms of fellowship with the trustees of the Christy Museum, and have reciprocated with them in the exchange of specimens. I do not forget, also, my more distant friends, particularly Captain Oliver Eldridge, of San Francisco, and Mr. Edward Lamb, of Buenos Ayres, both of whom take a warm interest in the Museum. The former is now endeavouring to procure for us some of the contents of one of the mounds of California, which is about to be opened by a friend; whilst the latter, in addition to sending by the last mail a collection of photographs of some of the aboriginies of South America, informs me of the rumoured discovery on a farm in the province of Salta, near the slopes of the Bolivian Andes, of gigantic fossil human remains; an account of which Mr. Lamb has kindly promised to send me, should the report prove correct. To the great kindness of Admiral the Hon. E. A. J. Harris, C.B., H.M. Minister at Berne, who was assisted by those eminent Swiss archæologists, Dr. Keller, Professor Rutimeyer, Dr. Uhlmann, and the late M. Troyon, we are indebted for a very complete series of antiquities from some of the earlier lake-settlements of Switzerland; whilst Dr. Felix Garrigou, of Tarascon, and Mr. Adlam, of this city, have both kindly undertaken excavations; the former in the caves of the South of France, and the latter in some pit-dwellings at Fisherton, with the view of increasing knowledge and enriching the present collection. But, as many of you are aware, it is chiefly to the untiring zeal, the indefatigable energy, and the love of science of my brother-in-law, Mr. Stevens, that the Museum owes, not only its present complete state of arrangement, but even its very existence—and I cannot but feel it a matter of congratulation that, associated as our families have been for several generations, those of us at the present day are still more closely united by the bond arising from our being engaged in the same scientific pursuits. And now my Lord President, it only remains for me formally to transfer to you and the other members of the committee of the Salisbury and South Wilts Museum, the future management of this Museum, and in doing so I venture to express the hope that some of the objects which I have indicated will be realised, and more particularly that the free use of the Museum will be a benefit to the inhabitants of my native city of Salisbury.

When the applause which had many times interrupted, and now followed the conclusion of Mr. Blackmore's address, had subsided, The Right Rev. CHAIRMAN said that in undertaking the charge which he had been requested to accept, his first duty was to express his earnest thanks, which he was sure were the thanks of all present, to Mr. Blackmore, for what he had done for his native city. He could not accede to Mr. Blackmore's request without some expression of his own feelings on this point. He would gladly have been the means of formally conveying to him the thanks not only of that meeting but of all the inhabitants of Salisbury, but that function was not to devolve upon him, because there was one present who could do it far better than himself, and who was thoroughly acquainted with the treasures contained in the Museum,—he meant his dear friend the Dean behind him, entirely in whose hands, therefore he would leave the matter. He had only two things to say before calling upon the Dean to discharge that function. One was with regard to himself, viz., that whatever he could do, as President of that institution, in order to show appreciation of Mr. Blackmore's consideration for those now living in his native city, he pledged himself to do with all his heart. The other thing did not concern himself so much, but it concerned those who were present, and those who had any relation with the city; and it was a bit of good advice, viz., that under the guidance of Mr. Blackmore's example, they also should endeavour to benefit the place in which they were born, and to which they must owe so much. Mr. Blackmore had set them a noble example in not forgetting his native city, and he (the Bishop) trusted they would profit by it. They did not, of course, wish to keep with them all the most excellent persons who were born and bred in the city. Some of them must, of necessity, go forth into other lands, and find other homes, but what they hoped was that when God prospered them away, they would follow Mr. Blackmore's example, and give to those whom they left behind them similar opportunities of improving themselves as he had done. Mr. Blackmore had set them an example in another matter; he had not been content with remembering only his native city, he had identified also with his good wishes the native place of Mrs. Blackmore. If they would go to the parish church of Bishopstone, they would find he wished to testify that he was connected with that place also, through Mrs. Blackmore, his wife. One other thing he must be allowed to say was this, that although Mr. Blackmore had only made over to them the guardianship of his Museum, he was yet sure that he had done it with a wise and good intention, viz., to see how far the people of Salisbury were fairly represented by his brother-in-law, Mr. Stevens, and had anything like the zeal for such things which he had manifested: that it was merely to ascertain how far they were fitted to be trusted with with such a valuable collection. His only hope was that the people of Salisbury would never give Mr. Blackmore reason to say, "I have lent to the city of Salisbury a most valuable collection, and they have shown no real appreciation of it." He earnestly hoped that they would, on the contrary, give proof day by day, by the use they made of the Museum, that Mr. Blackmore had wisely judged that the spirit of Mr. Stevens animated them also. When that was done, he was satisfied, without having had a word with Mr. Blackmore on the subject, that the spirit which had led him to prefer a local place for the deposit of the collection, would encourage him to believe that he had taken a right course, and would also determine him not to deviate from it. He would not tread further on such delicate ground, but he could not miss that public opportunity of urging them to prove themselves worthy of the confidence Mr. Blackmore had reposed in them. He was sure the Mayor would concur in what he had said, and that His Worship would join him in endeavouring to impress upon the minds of their fellow-citizens that a great trust had been committed to them, and that they would be doing wrong in their generation if they did not endeavour to prove themselves in every way worthy of it.

The very Rev. the DEAN then rose and said:—We cannot look around upon the noble apartment in which we are assembled, and on the antiquarian treasures it contains, without feeling how justly our acknowledgments are due to the munificent founder of this Museum. Those only who have made the subject their special study, can adequately appreciate the service he has thus rendered to archæology. From the concise, yet lucid and comprehensive notice of the Blackmore Museum, which I hold in my hand, an excellent general idea may be obtained of its contents. But it may be hoped that it will soon be followed by the publication of a descriptive catalogue, a work, which I venture to say, no one is so competent to undertake as the gentleman to whose ability, zeal, and extensive knowledge of archæology we owe the admirable arrangements of the specimens we see before us. Mere description, after all, can convey but a faint notion of this valuable, and in one department, at least, unique collection. It is only by a careful and minute examination of it that a proper estimate can be formed of its scientific importance. From the light which it is calculated to throw upon many deeply interesting questions connected with ethnology and geology, it has attracted in no ordinary degree, the attention of men of science, not only in our own country, but I believe that I am justified in saying, on the continent also, and even in America. In proof of the general interest it has excited, I may be permitted to allude to the many distinguished strangers who have, on this occasion, honoured us with their presence;—while at the same time we must all regret the absence of several gentlemen of the highest eminence, whom their allegiance to the British Association has called to the North. It may be assumed, then, especially after what has just fallen from Mr. Blackmore himself, that to stimulate and encourage the study, not of archæology alone, but of natural history and physical science in general, was one main purpose of these kindred institutions. Now I am fully aware of the distrust with which such pursuits are frequently apt to be regarded. But let not the mind of the Christian be perplexed and disquieted when the discoveries of modern science appear to be at variance with the letter of Holy Writ. There can be no real antagonism between religion and science. That collisions are unhappily of frequent occurrence between them is too true. But, let it not be supposed these are caused by any necessary and inherent opposition between the word of God in revelation, and the works of God in creation. They arise, I am persuaded, in great measure from a misapprehension of the nature of Scriptural language, and the character of Scriptural Truth. Wherever our duties and responsibilities to God and man are concerned, *there* the language of Scripture is clear and precise; but in matters having no relation to them, the sacred writers are either wholly silent, or express themselves in the language of ordinary life. Now, let me ask—Who would dream of imputing ignorance of the earth's motion to an educated man of the present day, because he speaks of sunrise or sunset? Well, it would be just as irrational to charge the Bible with error, because it describes the general aspect of nature in language adapted to the habits and knowledge of the great bulk of mankind. Here let me appeal to the authority of the late learned and pious Archbishop Sumner. Speaking of the Mosaic Records, he says, "There is nothing in them, either to gratify the curiosity, or to repress the researches of mankind, when brought, in the progress of cultivation, to calculate the motions of the heavenly bodies, or to speculate on the formation of the globe. The expressions of Moses are manifestly accommodated to the first familiar notions derived from the visible appearances of the earth and heavens; and the absurdity of supposing that the literal interpretations of terms in Scripture ought to interfere with the advancement of scientific inquiries, would have been as generally forgotten as renounced, if the oppressors of Galileo had not found a place in history." It cannot be too frequently and too earnestly repeated that the Bible is a spiritual revelation, and not a revelation of physical science. If the Christian would only take his stand upon this unassailable ground, one of the most formidable weapons of his adversaries would drop from their grasp. So long as the researches of men of science are conducted in a reverent spirit, and on the strictest principles of induction, we need be under no apprehension of injury to our faith from the conclusions at which they legitimately arrive. We, therefore, have a firm assurance that, from whatever source it be derived, whether from the discoveries of astronomy, or from the scarcely less marvellous discoveries of geology, truth must always be consistent with itself, and in perfect harmony with the Book of Life, when rightly interpreted and understood. I shall conclude these brief remarks with a few words, in which the ideal of the Christian philosopher is sketched with a master's hand. "The student of nature," says the Bishop of St. David's, "who, without surrendering a particle of physical truth, or admitting any restriction on the freedom of scientific investigation, is yet able to withstand the most dangerous temptation which besets his favourite pursuits, the tendency to a mechanical philosophy, or to resting in second causes; and who, resigning himself to the consciousness of his limited faculties and imperfect knowledge, clings to the centre of his spiritual being, and finds a secure anchorage in the love of his Heavenly Father, as revealed in the gospel of Jesus Christ—such an one exhibits one of the noblest examples of Christian humility, wisdom, and self-control, which in these days it is possible to witness."

The Rev. A. C. Smith said that in the absence of the President of the Archæological Society of Wiltshire, Sir John Awdry, who had fully intended to be present, but was hindered by a domestic trouble, the honour devolved upon him in the capacity of Secretary to that Society, to second the vote of thanks to Dr. Blackmore, which had been so ably moved by the Dean. He was sure that there was no Society which ought to rejoice more cordially than the Archæological Society of Wiltshire, on the establishment of that magnificent Museum. He was equally certain, that no body of men owed so deep a debt of gratitude to Mr. Blackmore as the Archæologists of Wiltshire. Engaged as they had been, with more or less success, for 14 years, in endeavouring to discover and put before the public the antiquities and Natural History of the county and toiling on as they had been, slowly though surely, along that somewhat uphill path, they had never such an impetus given to their labours as on the present occasion. He might say that Archæology in Wiltshire had made a great stride in advance on account of this institution, and he begged most cordially to tender the thanks of all to Mr. Blackmore for what he had done. And in doing so, he could not but congratulate, not only the city of Salisbury but the whole county of Wilts in that they possessed within its limits such a magnificent collection as was contained in this Museum—a collection which was of untold benefit to the students in Archæology, and one which, he was bold to say, was second to none in the world.

Mr. W. Blackmore, who on rising was received with renewed applause, said for the vote of thanks which they had so kindly and cordially given, he begged heartily to thank them. He could assure them that nothing was wanting to add to the pleasure he felt in transferring his collection, but the appreciation which the citizens of Salisbury had shown of its reception. He only hoped that one and all would, to use the words of the President, do what they could for the city. He had done something in one direction, but it must not be forgotten that others were doing as much, or far more, in other directions: he need only again refer to those who had benefited the town by the sanitary alterations and improvements which had been made, and which he conceived to be of far greater importance than the placing in the town of any Museum.

Mr. EVANS said he had been called upon to propose a resolution which he was sure would meet with the approval of all; and perhaps he as a stranger, was better able to bring it under their notice than any one more immediately connected with the city. Salisbury might well indeed be grateful for the extreme liberality of the founder of that Museum. No one could speak in terms of sufficient praise of that liberality; but there were others who had been associated with Mr. Blackmore in that great work, to whom their thanks were also due. And in thus speaking, he was speaking not only on behalf of that more favoured part of the country, but also on behalf of antiquaries and natural philosophers throughout the world. Occasions could but have rarely existed for showing a collection to such advantage. It was very seldom that so large a collection could, by any possibility, be formed at one time, and that a building could be erected expressly to contain it, instead of some existing buildings being adapted for the purpose. He had visited a great many Museums not only in England but in various countries, and he must confess that in no instance whatever had he met with such a collection shown to such advantage as the Blackmore collection in that Museum. The collection itself was one which to him, as a collector, was perfectly surprising; and he was utterly astonished at the energy of one or two individuals in arranging it to such perfection in so short a space of time. They had not only one but half-a-dozen collections, all good of their kind. The collection of American antiquities which formed the nucleus of the Museum was, he believed, unequalled in the world. The collection, too, of implements from the Drift was almost unrivalled. There was also a collection from the French caves, which hardly any other institution could show, while the collections from Denmark, England, and other countries where similar remains were found were likewise admirable. Having said these few words, he begged to propose a vote of thanks to Dr. Humphrey Blackmore, whose knowledge of natural history, and whose zeal in the pursuit of geological science were equally remarkable, and who with his brother-in-law, Mr. Stevens, had most ably assisted in carrying out the great work which Mr. William Blackmore had had in hand. He would only express a hope that the aspirations of the founder would be carried out, and that the words adopted by Lord Bacon on the title-page of his Advancement of Learning, "many shall run to and fro, and knowledge shall be increased"—may be fulfilled.

The Rev. Prebendary SCARTH said he appeared before them as a very unworthy representative of the Bath Natural History Society and Antiquarian Field Club, and as such he had great pleasure in seconding the vote of thanks which had just been proposed. He would express to all present the great pleasure and instruction he and his friends had derived from their visit to this most interesting Museum. If Museums could be established in all provincial towns, they would be the means of benefitting the country generally. Last year, a German of some eminence, who was editing a large work, visited England, and since that time had issued a report, in which he stated that in no country in Europe were such pains taken to preserve ancient monuments, so much pains taken to record what had been found, or so much pains taken by local societies in their preservation. If he could present such a report, after what he had seen at Bath, York, Durham, and other places, what would he have said if he could have visited Salisbury and seen the admirable arrangement of the Blackmore collection? They had there the early implements of primeval man brought together in a city pre-eminently suited for the purpose. They had in this county the noblest remains of antiquities probably existing in the world. They had Avebury and Stonehenge—huge megalithic monuments—and wonderful barrows, beautifully illustrated by former residents, and his most esteemed friend Dr. Thurnam. They had Museums at Stourhead and elsewhere, he hoped catalogued and well preserved, and now they had increased their already rich store by this wonderful collection, which, he had no doubt, would make the city the resort o learned men from all parts of the world—Europe, Asia, Africa, an

America. Another point on which he must touch was the kindness with which strangers were received in this most hospitable city, by the Bishop, the Dean, and the inhabitants generally, to whom he begged, on behalf of the Bath Field Club, to return their sincere thanks. He hoped that generations of such men as Mr. Blackmore would be continued to the end of time, and further that gentlemen connected with other cities would take up the cause, and follow his example, if not as munificently, at least to the best of their ability.

It is almost needless to add that the resolution was carried by acclamation.

Dr. Blackmore said he felt deeply the honour that Mr. Evans had done him in mentioning his name in connection with the Museum. He had done what he could to carry out his brother's idea, and had endeavoured to arrange one branch of this collection. The department which had fallen more particularly into his hands was that of comparative anatomy, and although looking at old bones was not so attractive to many as looking at flint and other implements, yet of course the minor differences which were present in the different specimens, indicated differences of genera and species most important to scientific persons. It is true the general public takes but little interest in the minute study of comparative anatomy, still in the broader truths that are worked out all must feel an interest. The mere knowledge that our county was inhabited at a far distant period by strange creatures such as those to which his brother had alluded, enables us to appreciate the great alteration which must have taken place in our climate since the bones of the mammoth were deposited at Fisherton. The majority of specimens exhibited also possess a double interest from the fact of their being found in this immediate neighbourhood. In other cases they would find remains of the cave bear from the Pyrenees, and the reindeer from the south of France. It is not, however, until a comparatively late date that we find the occurrence of the most useful creature, as far as man is concerned, viz., the sheep. Closing the series a few bones are exhibited from the peat. This short explanation is necessary, because the ladies spoke of this part of the collection as "those horrid old bones,"—and to a certain extent he felt the accusation was merited. They were not beautiful and do not appeal very much to the eye, still regarded as monuments of creatures which once lived here, they are of much value.

The MAYOR said he esteemed it a high privilege to be permitted to take part in these interesting proceedings. He occupied a position different from that of each of the gentlemen who had previously addressed them; and he thought it was only another instance of the fitness of things, that whereas the Bishop, the Dean, and other scientific men, had a natural right to speak on matters connected with education and science, he should stand forward as the type of those persons who, in the present and the future, would be recipients of the benefits of that institution. No one who had been associated as he had been for so many years with Salisbury, could hear or see anything going on around him for the advancement of the city, without feeling grateful to those who promoted that advancement. He was deeply grateful, therefore, to Mr. Blackmore for having founded that noble institution. He trusted that Salisbury might so to speak, be educated up to an appreciation of such a noble institution as the Blackmore Museum. He had now the pleasing duty of proposing a cordial expression of thanks to a gentleman without whom he might say, even in the presence of the founder, that Museum would never have arrived at its present state of perfection. He was sure that both Mr. and Dr. Blackmore would agree with him in saying that Mr. Stevens had been a giant in this matter. He could scarcely understand how, pressed as he was by the calls of business, that gentleman could have developed this Museum to the point at which it had now arrived. Nothing but the most indefatigable efforts, aided by a deeply-rooted love of science could have carried him through it. He had laboured incessantly and had persevered against many matters to which he (the Mayor) need not allude, tending to damp his energies. He would not overlay his proposal by any fulsome eulogy of Mr. Stevens, but would at once ask them to acquiesce in the wish that his life might long be spared to watch over, protect, and advance that noble institution.

Earl NELSON said a very easy task had been imposed upon him, but before he alluded to the special point of seconding the resolution, he must, in common with everybody who had heard it, give vent to the feelings which the simple, earnest statement of Mr. Blackmore had elicited: feelings not only of gratitude but of admiration of the spirit and motives which had moved him to lend such a magnificent collection to his native city. He wished to make one other remark, though it was, perhaps, hardly his place to make it. He could not help thinking, notwithstanding what the Dean had said, that although it might not be the place to look for it, there was yet a great deal of science in the Bible. One thing was quite certain: believers in inspiration need have no fear whatever of science, as long as it was thoroughly carried out. Even at the time when Galileo was persecuted for his views, that text which we read in the Psalms existed, "He has made the round world so sure that it cannot be moved." Now the view of Hebrew scholars was that the real meaning of that text was not that the world did not move, that it was a fixed thing, but that it could not totter, so to speak, in its motion. Again he fearlessly asserted that nobody could read our beautiful poetic translation of the Book of Job, without being certain that there were greater things of science there than the greatest philosophers had yet discovered. Let them not then, come to the conclusion that Scripture was falling short of the revelations of science. They must remember that in translating it was often impossible to convey the meaning of one language by means of another. In the days of the Septuagint translation many of the animals to which reference was made in the original Hebrew, were unknown, and therefore the exact meaning might not at all times have been conveyed by the translators, He himself believed, therefore, that science would elucidate the Bible, and that it would also be found that the Bible was full of science. And now he must address himself to the resolution he had been asked to second—viz., a vote of thanks to Mr. Stevens. If it were anywhere else, he should lament that the task should have fallen upon him, because where he was not known, it would require a scientific man thoroughly to elucidate and set forth the prominent points in Mr. Stevens's character. But in a place where many of them had had the pleasure of knowing him from his childhood, no explanation was required on those points. Last night was the first time that he had seen the Museum, and although he went only partially through it, he was immediately struck, as everybody else must have been, not only with the beauty of the room, but with the wonderful way in which the things were arranged. He believed an immense deal of that result was due to Mr. Stevens, whose admirable summary of the contents of the Museum was, he believed, but the precursor of a thorough catalogue. He was sure that all these things would commend the resolution to the notice of all those who knew Mr. Stevens so well and respected him so much.

Mr. E. T. Stevens said he had been rather over occupied up to the last moment; if therefore he should unfortunately overlook any particular point, or any particular person, they must attribute it to this cause. In the first place, they must allow him to refer to a point which had been alluded to by Mr. Blackmore, and to express regret at the absence of a number of men of science, and he might likewise say, personal friends of the founder and himself: men who had worked with them through this undertaking, and who are pioneers in the subjects illustrated by the Museum. Mr. Stevens read a letter which he had received from Sir Charles Lyell, expressing regret at his inability to attend, and adding "I know of no collection in England or on the continent which is more calculated to throw light on pre-historic man, than that which adorns the city which was formerly associated in my mind with Stonehenge, and which is now intimately connected with the discovery of monuments of far higher antiquity." He also read a letter from Sir John Lubbock, stating that "Your Museum will be an honor to Salisbury, and will add additional interest even to a county so rich as yours in archæological treasures. Mr. Blackmore deserves the hearty thanks of all scientific men for the zeal with which he has brought together so rich a collection. I must add that the arrangement you have adopted also seems to me excellent." The reason of their having selected a day for the inauguration of the Museum which clashed with the meeting of the British Association was this—the Bishop, who is President of the Salisbury and South Wilts Museum, had from the first, felt the liveliest interest in the furtherance of the Museum movement in Salisbury, and on consulting with his lordship, it was found that there was no other day in the present month, on which his attendance could be secured. Mr. Blackmore felt immediately that whoever else they might lose, it was desirable that the Bishop should be amongst them, particularly as his lordship's presence would give a local character to the meeting. After a brief but affecting allusion to the great loss which the Museum had sustained by the recent death of the Rev. Prebendary Chermside, Mr. Stevens expressed the gratification which they derived from the visit of so many distinguished members of the various learned societies in the neighbourhood. Speaking of the objects of the founder, Mr. Stevens said they had no better guarantee of the sincerity of Mr. Blackmore's intentions, and he might add of the desire on his part that they should trust him, than in the way in which he had spoken to them that day. Let them tie the Museum to Salisbury if they would, but let it be with cords of love and affection. Perhaps they would pardon him if he said that parchments were not half so binding as that; when a man did a thing with heart and soul for the good of the town, they had in that itself a guarantee that he would continue to do it. He wished to say, too, that the founder was jealous for the collection, which represented, not the work of one man's life, but of several men's lives; the credit was not all due to those who had placed it in Salisbury, for other men had laboured in forming the collection. Money alone could not purchase such a Museum; there had in the present instance been singular opportunities of rendering the series illustrative and complete; indeed many of the objects once lost could not be replaced at any cost. Mr. Stevens moved a cordial vote of thanks to the deputations who were present from different scientific societies.

Mr. W. Blackmore briefly seconded the motion, saying he had had very great pleasure in making the acquaintance of the gentlemen who had attended as deputations from the various societies, and he trusted the bond of union between the Wiltshire Archæological Society and those connected with the Museum would long continue.

The motion was unanimously adopted by the meeting, and Mr. Gabriel Goldney, M.P., who formed one of the deputations from the Wiltshire Archæological Society, then said:—I am very happy to stand forward on behalf of the Wiltshire Archæological Society for the purpose of returning thanks for the vote which you have just passed, and I very much regret the unfortunate absence of Sir John Awdry on this occasion, because in his position of President of the Society, he would do it much more ably, and much more fittingly than I can. This is the first time that I have had an opportunity of seeing this room, and I can assure you it has afforded me a very great amount of gratification, not only to see these wonderful treasures and this magnificent building, but to find a Wiltshire man so patriotic and so good in feeling for his native county and town, as to have made this magnificent gift, for the glorification of the city, because I am sure it will be one of the great lions of future times. I, myself, have not given a very great amount of attention to matters of this sort, but I have been struck with the remarks which have been made during the course of the morning, and especially some which have fallen from Mr. Stevens, with regard to the classification of objects. I think in Copenhagen they have for sometime adopted a classification to show the different ages and eras, and to show also how much the articles had been in use in common. They have also adopted there the very excellent system of offering in prizes the full value of anything discovered, so that parties may bring them to the Government Collection, and obtain there the value of them, and that they may not pass into private hands and be lost sight of. With regard to localities, we are at the present time paying a very large sum of money for great institutions, and I believe some of the objects are circulated. Some of them came down to this city on the occasion of the Agricultural Society's meeting here, and I am sure it would be a very great benefit if catalogues of Institutions like this, and more general ones in the kingdom, were printed and circulated, so that there might be that interchange of knowledge, and that the contents of the great museums might be made known to people, and pointing out to them some mode by which they might test the value of things found, and add to the instruction now so generally sought for by parties with regard to the illustration of our former history. Everything now is being illustrated materially by the more minute investigation of subjects; even the historical events of our times are brought out in very great force by the letters that have been discovered of great people of different eras. Take the case, alone, of Queen Elizabeth and that period of our history. We merely read in old history of the different wars that took place, and the conquests which were made by one nation over another. Now parties are directing attention more particularly to social affairs and the concerns of the different periods; and in the same way these different implements that are now brought together in this vast extent and variety, show the manners and habits of man in their truthful character, that no one ever conceived, or thought of, or dreamt of, until parties had applied themselves like Professor Buckland, who first discovered that from a single bone it was possible to build up a whole animal or bird, showing the construction of that animal or bird, and ascertaining, for instance, that a particular portion of a beak must have resulted in the formation of a bird of perhaps a certain size, and which must have lived in a certain atmosphere with a certain degree of heat or cold, and also showing the early state and the habitation of the people of this country. One portion of science leads on to another; it is the same way with the great inventions and discoveries of the last century. The invention of steam led to the formation of railroads, to the application of the electric telegraph. So by discoveries in knowledge and science; one person takes up the most minute things which are now passed by carelessly; but they will very probably be brought forward at some future day to show the state of man and his existence in periods long before what are now talked of. I believe it has been said by a celebrated philosopher, that the great difference between man and an animal, is in our having ten fingers, which enable us to touch things in a way that no animal could do; and so we have advanced very much by that means and conquered other parts of creation. However that may be, these specimens that we have before us show this one great fact; that there has been a gradual and continuous increase of the knowledge of man and his science of power over other portions of creation; but I think the culminating point as we see before us, is not only the increase of knowledge and power, but the very great increase of love and good feeling in Mr. Blackmore which has induced him to deposit this Museum in Salisbury. I am very proud, as being a Wiltshire man, that it has been placed in our county; and I for one am quite sure that we shall fully appreciate it, and I hope we shall endeavour to profit by it.

Mr. E. Kell, of Southampton, on behalf of the South of England Literary and Philosophical Society: and Mr. Alderman Stebbing, on behalf of the Council of the Hartley Institution, Southampton, also severally acknowledged the compliment offered to their respective Societies, each gentleman expressing his unbounded admiration of the collection, and of the arrangements of the objects, and passing a high eulogium on Mr. Blackmore for his generous liberality in establishing an institution which they agreed in declaring to be to a great extent perfectly unique of its kind, and calculated to be a great benefit, not only to Salisbury and Wiltshire, but to the country at large.

Mr. John Lambert then rose to propose a vote of thanks to the Mayor and Corporation for having honoured the meeting with their presence that day. Preliminary to proposing that resolution he might perhaps be permitted to express the extreme satisfaction with which he had witnessed the proceedings of that and the previous day. He might speak with something like pride with reference to those proceedings, because his excellent friend and relative who sat on his right (Mr. Blackmore) was formerly a pupil of his; but not in archæology. The master of those days now sat, or rather stood, at the feet of his pupil in the hall of archæology. In the course of his interesting speech, Mr. Blackmore had spoken of his desire to promote and diffuse knowledge; and perhaps the meeting would pardon him for mentioning an incident connected with his (Mr. Blackmore's) early life, showing how early such a feeling had begun to take possession of his mind. After a long and laborious day of study, he had known Mr. Blackmore, when a mere boy, go into the neighbouring village of Harnham, regularly every night of the week for the purpose of giving instruction to the children of the agricultural labourers. From him (Mr. Lambert) Mr. Blackmore gained no such taste for archæological knowledge as he possessed now; but there was one, a relative of both Mr. Blackmore and himself, who first instilled those principles into his mind, and whose name never ought to be mentioned, and never would be mentioned in Salisbury without feelings of respect. He alluded to the name of the late Mr. Shorto. That gentleman, however, was aided by Mr. Blackmore's mother, than whom he (Mr. Lambert) knew no one to whom, from refinement of mind, desire to promote education, and unpretentious knowledge, he could point so readily as a person who could second the efforts of her own father in endeavouring to infuse a thirst for scientific and archæological pursuits into the mind of her son. He had thought it due to Mr. Blackmore to make those remarks before going to the subject of the resolution which he had been requested to move; and now he could say that there was no one who could feel a greater interest in the resolution than he did himself, because it was his good fortune for many years to be associated with the Town Council of Salisbury, as a working member of their body. Moreover, it was equally his good fortune to be associated with the Town Council of Salisbury when they undertook those admirable sanitary arrangements which, he might say, now made them the envy of this country and of some foreign countries also, for it was only within a very short period that communications had been addressed here by high officials in Prussia for the purpose of obtaining information as to the manner in which the sanitary arrangements of Salisbury had been effected. With reference to those sanitary arrangements, the Corporation of Salisbury took a leading and most active part, and he wished in connection with this subject, to mention another circumstance namely, that without the cordial co-operation of the Very Rev. the Dean and the clergy of the Close, who united to a man in promoting sanitary reform, the improvements to which he alluded never would have been effected. But something more was required; if they had established a healthy character for Salisbury there was still something else necessary to be done. They had yet to provide the amusement and instruction of the visitors who came here; and this could not be more effectually or agreeably done, than by collecting the objects of interest found in the neighbourhood. It was an extremely satisfactory circumstance that the Mayor and Corporation had recently shown that they were most favourable to the promotion of everything which had for its object the improvement of the town, and they were now putting themselves forward for the purpose of providing those very objects of recreation and instruction which were so essential and so much needed. On the part of Mr. Blackmore he might, perhaps, be permitted to express his deep gratitude, to the Mayor and Corporation for their presence that day. They had heard some circumstances alluded to with regard to the permanence of the Museum; but so long as the Mayor and Corporation possessed the same feeling as they did now, so long as they were determined to encourage and second every effort which was made for the purpose of amusing and instructing the inhabitants, he would undertake to say that the Blackmore Museum would never change hands, or be removed. It was a matter of good understanding and good feeling between the two—it was a union which had been cemented not upon a written agreement, but upon an honourable understanding, and that understanding was one of the strongest reasons why it should continue. The cordial co-operation of the Mayor and Corporation, and the Blackmore trustees, would render it a perpetual union which neither time nor anything else would be able to destroy.

Mr. M. H. Marsh, M.P., in seconding the motion, said it must be a source of great gratification to the citizens to have such a magnificent institution given to them by his friend, Mr. Blackmore, for the encouragement of science and for the edification of the public. It would be a great advantage to the public generally, and he was sure they ought to be most grateful to Mr. Blackmore for it. He was confident that the Mayor and Corporation thoroughly appreciated it, and saw the benefit which it would be to the city. Before sitting down, the hon. member said he could not help alluding to the excellent speech of the Very Rev. the Dean, which was conceived in the true spirit of science and truth; and he was sure that such a spirit as that would have the effect of making the people not only wise, but good also.

The motion was cordially accepted, and the Mayor briefly returned thanks.

Mr. Flower, F.G.S. (of Croydon), then rose and said:—On behalf of this most important Society, of which I am an Associate, and on behalf of all I see before me, I beg to propose a resolution which I am sure will be received with acclamation, namely, that of our thanks to the Lord Bishop for presiding on this occasion. Those thanks are due to him not only by this Society, but for the exertions he has made to promote an interest in the proceedings, and also for the courtesy and kindness he has shown on this occasion. We present the aspect of a very happy family, for we all participate in one common feeling of pride and satisfaction at the dedication of such a beautiful building to the purpose of science, containing as it does such a magnificent collection—a gift not only to the county but to the empire; for I believe with my friend Mr. Evans, that no such collection exists in the kingdom, or is likely to exist for some time to come. And if this is felt by outsiders, how much more gratifying must it be to you, my Lord Bishop, and the gentlemen connected with the Corporation, and the county, and especially this city, to know that all this is the work of a Salisbury man. It is due to the munificence of my friend, Mr. Blackmore, to the exertions and scientific knowledge of his brother Doctor Blackmore, and the unwearied energy and perseverance of Mr. Stevens. It is not given to every man, as it is to my friend, Mr. Blackmore, to witness the result of his labours. Many men give their efforts, their time, and their energies to a very unthankful generation, and not unfrequently, many men die and go without fame; but that is not the case with my friend, Mr. Blackmore, for great as are his labours, and great as are his exertions, I am sure they are amply repaid by what has taken place, and by this public recognition of the services which he has performed for the city, for the county, for the kingdom in general. One who knew human nature has said,

> "The evil, that men do, lives after them;
> The good, is oft interred with their bones;

I trust, however, and indeed I am sure, that this is not the case in the present instance; for long after we are gathered to our fathers, I trust these dry bones which we now see around us will speak to future students, and that those who walk through this hall and the accompanying building, will ever be grateful and thankful to the founder of the Blackmore Museum. I must apologise for travelling a little from the subject, but this occasion is one which would perhaps warrant me in doing so; I will no longer detain you, however, but ask of you to acknowledge with gratitude your thanks for the services of the Lord Bishop on this occasion.

Mr. E. T. STEVENS begged to second the vote of thanks to the Right Rev. Chairman, which had been proposed by Mr. Flower. The Bishop, however, not only deserved the hearty thanks of this meeting for presiding upon the present occasion, thanks are also due to his Lordship for the invaluable assistance he has rendered to the parent Museum from its first establishment in Salisbury. But for the success which attended the efforts of the Committee to render the Salisbury and South Wilts Museum worthy of this city, Mr. Blackmore would not have entertained the idea of placing his collection in Salisbury. Every gentleman who has acted upon that Committee knows how greatly such success is due to the judicious advice and counsel of the Right Rev. President and Chairman; to him, therefore, we are, in no slight degree, indebted for the actual establishment in Salisbury of the Museum we have assembled to inaugurate. The Bishop has given the Museum movement no half support; he has encouraged it with all his heart, and for this, we, one and all, desire to thank him from our hearts.

His LORDSHIP, in reply, expressed his earnest hope that the Museum which had that day been opened would be an additional means of cementing good feeling between the different parts of the county. His lordship said he could not leave the chair without again expressing on behalf of himself and the citizens of Salisbury, very deep obligation to his friend Mr. Blackmore, for what he had done for them; and he earnestly trusted that God would spare their friend many years to see the fruit of his labour. He was perfectly persuaded that what his friend Mr. Lambert had said was an exact interpretation of the trust deed to which he had alluded—that they were in fact put upon their trial, and that if they went through that ordeal well, as they ought to do, they would find that Mr. Blackmore would never want to find a new home for those beautiful possessions which he had at present entrusted to their care.

This concluded the afternoon proceedings.

CONVERSAZIONE ON THURSDAY EVENING.

On the same evening (Thursday), a second conversazione was held at the Blackmore Museum, which was very numerously attended, and at which the Lord Bishop of the Diocese again presided.

The Bishop at once called upon Mr. Evans to give the second portion of his address on the "Earliest known works of Man," adding that it was quite unnecessary to introduce that gentleman to the meeting, inasmuch as from the interest he had excited in all who heard his able address on the previous evening, every one was quite eager to welcome him again.

Man and his Earliest known Works.

The Archæolithic Period.

Mr. Evans, F.R.S., F.G.S., then said:—My Lord, ladies and gentlemen, I had the honour last night of addressing you upon the subject of "Man and his Earliest known Works," and on that occasion I confined myself to what is called the Neolithic, or later stone period. This evening, I hope to give you some account of the earlier stone period, that is to say, of a period in which apparently a less degree of civilization prevailed, and which is known as the Archæolithic or Palæolithic stone period. The principal characteristic of this period is that at the time when the men who formed the implements which are known as those of the Archæolithic period lived, there were still in those countries where they lived, a certain number of animals which have now become either totally or locally extinct. Generally speaking, this period may be divided into two —that of the caves, and that of the river gravels, or what has been known as the Drift period.

I will first give you a short outline of some of the principal features of the implements of the Cave period. The idea of the co-existence of man with some animals now either locally or totally extinct, is not a new one. For many years, researches in various caverns, both on the Continent and in America, have given evidence of the existence of man in those caverns with animals no longer known in the neighbourhoods where the caverns containing the works and remains of man exist. M.M. Tournal, Christol, Schmerling, and others on the Continent; Mr. Mac Enery, Dr. Falconer, and others among Englishmen, have written upon the subject of the co-existence of man with these extinct mammals; and at a later period, M. Lartet, my lamented friend Mr. Christy, Dr. Dupont, M. Garrigou and others, have thrown great light upon a series of objects which have been found in the caves of France. You have in this admirable Museum a large number of objects partly collected by M. Garrigou, and partly by M. Lartet and Mr. Christy, as well as some from the caves of Gibraltar.

It is principally with regard to the remains which have been found in the caves in the department of the Dordogne that I propose to address you. I need hardly refer to a work which is now in course of publication, the Reliquiæ Aquitanicæ, in which you will find a detailed account of the principal objects discovered, accompanied by most excellent illustrations.

These caves of the Dordogne occur generally under the ledges of the limestone rock, along the course of the river Dordogne, affording natural shelters in which the original inhabitants of the country took refuge, and in which the inhabitants of the present time are also in the habit of constructing cottages and houses. Frequently you find the floor of these caves to consist of a mass of stalagmite, showing underneath, on being broken up, a varied accumulation of matter, principally consisting of fractured bones, mixed up with flints, and other stones. In some cases I have seen this deposit of refuse-matter amounting in thickness to as much as five or six feet, the whole consisting of broken bones, of hearth-stones, of hammer stones, of flint knives, and flint fragments of other descriptions, mixed up also with bone implements and other evidences of man having lived for a length of time on the spot. All the bones of which the heaps consist resemble very closely in character the bones found in the kitchen-midden heaps of Denmark, some slight account of which I gave you last evening. They are all broken up, for the purpose of extracting the marrow, and they consist of bones of animals which apparently have been eaten. These are mixed up in such a manner, with implements used for cutting the meat off them, and for other purposes, as to give evidence of a long-continued occupation. The implements principally consist of flint flakes, flint knives, specimens of which you will see in the cases around you, and which, therefore, I need not particularly describe.

There is, however, one point of interest in connection with these flakes, viz., that you find upon them evidence of their having been used as implements. You will often find one side of the flake perfectly sharp and uninjured. This was apparently inserted in a wooden handle in the same way as those found in the pile dwellings of Switzerland. The other edge shows marks of abrasion, apparently produced by scraping bone objects. Among the bone objects are found a large number of barbed heads of harpoons. There also occur in these caves small and exquisitely made needles, with an eye not quite so small as in the needle of the present day, but still so minute that you can hardly imagine it to have been perforated with one of these fragments of flint. But my friend Dr. Falconer proved that the eye could be so perforated, by taking some of the fragments and himself producing with them a needle in all respects similar to those found beneath the stalagmite. Besides cores or blocks of flint, a number of scrapers are likewise found, similar to those in use among the Esquimaux for scraping skins at the present day. There are also lance-heads and probably arrow-heads. Besides these we meet with stones which have been used as mortars—apparently for grinding or pounding some sort of food—and a variety of other objects of different forms, principally constructed from the horns of the reindeer.

Now the animals whose remains have been discovered, are such as no longer exist in the part of the world where these caves occur. You will find that one of the principal sources of food to the people who occupied these caves in the south of France was the flesh of the reindeer—an animal which no longer lives in such southern latitudes. In the present day we are accustomed to associate the reindeer with an arctic climate. It would appear, therefore, that at the time these caves were occupied in this manner, the climate of that part of the south of France was much colder than at present, otherwise we can hardly suppose that the reindeer would have been present in such abundance. Of course, there is a possibility of the habits of the reindeer having been changed to some extent: that they are now adapted to a colder climate than was the case then. Still it is hardly probable that so great a change could have taken place in the habits of the animal in the comparatively limited period which has elapsed from the time of the occupation of those caves. When I speak of a limited period, I speak geologically rather than historically.

In addition to that, another circumstance raises a presumption of a colder climate having prevailed, for otherwise the masses of animal refuse of which we find the floors of these caves to consist, could hardly have been compatible with the occupation of the caverns by man at the same time. In a warm climate, they would have become offensive in more senses than one.

In looking at the state of civilization of these people of the reindeer period of the south of France, we are struck with their skill, at all events in one of the fine arts. We find that they were capable of producing carvings and drawings such as are rarely to be found, even now, among savage tribes. There is a well-known carving found by Messrs. Lartet & Christy, in which a reindeer is represented with much spirit. It is adapted for the purpose of a handle to a dagger. But in the French Exhibition, as mentioned in Mr. Franks's paper last night, there are still more striking instances of the sculpture of the men of that period. And it is not a little curious that in these sculptured representations of the reindeer period there is the mammoth carved upon ivory derived from the mammoth itself. There are also, as mentioned by Mr. Franks, representations of the human form; and it is extremely remarkable that there is a close similarity between the objects buried in these caves when the reindeer abounded in the south of France, with the objects,—the arms, utensils, and domestic apparatus,—used by the Esquimaux at the present time, and among whom also we find the reindeer.

I quite agree with Mr. Franks that we can hardly assign all these caves to one period. You find, for instance, that there are certain caves in which certain forms of implements prevail, and from which certain other forms are absent. It would appear, therefore, that although these caves are in close proximity to each other, they were yet inhabited at different times.

The cave of Le Moustier seems to be the earliest in point of time, for there you get a series of implements more closely resembling in form those found in the river gravels than almost any others with which I am acquainted. There are also found in the Le Moustier cave, the remains of an earlier fauna than that of the ordinary reindeer period, such as the *elephas primigenius*, the mammoth, or woolly elephant. Among our own caves which have been excavated is that of Brixham, near Torquay, in which were found flint implements formed by the hand of man, and associated with them the remains of the cave bear and the extinct elephant. In the cavern known as Kent's Hole, now being excavated under the direction of a Committee of the British Association, above the stalagmite floor, remains have been found, dating back at all events to the bronze period; while below, associated with the remains of now extinct animals, such as the cave bear and the cave lion, the elephant and the rhinoceros, a number of flint implements have been discovered, bearing evidence of having been used by man, as well as of having been fabricated by him.

In other places you meet with a further advance in the manufacture of these implements. At *Laugerie Haute* you get a series of arrow-heads and lance-heads more nearly approximating in form and finish to those found in Denmark. In all probability the caves which contain implements of that particular character belong to a later period than that of Le Moustier. It is very singular that in the caves where you meet with the more finished implements, you do not find many representations of animals sculptured or carved upon bone. Taking even the latest caves of the reindeer period, you will find that between them and the earliest settlements of the neolithic stone period—when polished implements prevailed, there must have elapsed a long interval of time. For among the

Lake dwellings of Switzerland there are settlements in which none but stone implements appear to have been employed, and yet the reindeer is entirely absent. At the same time, in caves at no great distance from the lakes in which such settlements were placed, worked flints are found associated with remains of the reindeer, thus showing an earlier occupation of that part of Switzerland, than that which is characterized by the Lake dwellings.

In Belgium there has also been a discovery calculated to throw light on the chronological sequence of the different stone periods, but of which, up to the present time, I have not received a full and definite account. From information, however, which has been sent me from Belgium, it would appear that in one cavern there have been found the remains of three different stone periods superimposed one upon the other. In the upper deposits of this cavern, there have been found remains associated with the existing fauna of the district. Beneath, at a considerable depth, have occurred flint implements similar to those which occur in the reindeer caverns; more especially the scraper-like implements to which I have already referred. Then again there intervenes a considerable thickness of rubble derived from the walls of the caverns, at the base of which are found the remains of the rhinoceros and some other now locally extinct animals, associated with flint implements of that peculiar form which we are in the habit of finding in the river gravels. I hope, before long, to have some more authentic and satisfactory account of this interesting discovery, which at all events will show the sequence of these different periods of civilization, if it does not afford any comparative chronology for their different dates.

Looking at the time, I think you will feel that you have heard enough on the subject of these cave remains. I will therefore turn to the other part of my subject, viz., the flint implements derived from the river gravels, or flint implements from the drift, which I know must be a subject of considerable interest to persons living in the neighbourhood of Salisbury, where so many important discoveries of such implements have been made.

I cannot but feel, as I did last night, that among my audience there are many who know as much respecting this subject as I am able to tell them. Probably, however, there may be some to whom it may be of interest, if I go into some portion of the history of these discoveries.

It was in the year 1846 that M. Boucher de Perthes, a gentleman at Abbeville, gave an account of certain stone implements which had been found in that neighbourhood in the gravel, associated with the remains of extinct animals, which to his mind showed an extreme antiquity for the human race; but owing in a great measure to the inartistic manner in which the illustrations in his book were given, and owing also to some slight inaccuracy in the details, the matter did not receive that attention in France which it so justly merited.

Subsequently, in 1853, Dr. Rigollot, of Amiens, called attention to the same subject. He also did not find his views accepted by the scientific men of France. Luckily in the year 1858-59, the late Dr. Hugh Falconer, passing through France, stopped at Abbeville, and hearing of these discoveries, mentioned the subject to Mr. Prestwich, who in 1859 went to Amiens to test their value. With the view of investigating these important discoveries, he invited myself and others to accompany him. The others were prevented from joining Mr. Prestwich, but I went over to him, and we were fortunate enough to see one of these supposed implements still engaged in a bed of undisturbed gravel at a considerable depth from the surface; and I who did not believe in the slightest degree in the probability of this reputed discovery, was obliged to accept it as a genuine and most important one.

On our return to England we called attention to these discoveries. Mr. Prestwich gave an account of them to the Royal Society, and I also communicated a paper upon the subject to the Society of Antiquaries. At the very time when Mr. Prestwich was anxious to submit those implements which we had brought home from Amiens to some of his friends, I went to the rooms of the Society of Antiquaries for the purpose of inviting some antiquarian friends to come and see what we had brought home from France. I had told Mr. Prestwich that the implements which had been discovered in those beds were totally unlike anything known in this country, and that they presented altogether a new appearance. But while I was waiting in the rooms of the Society of Antiquaries, expecting some friends to come out from the meeting room, I looked at a case in one of the window seats, and was absolutely horror-struck to see in it three or four implements precisely resembling those found at Abbeville and Amiens. I enquired where they came from, but nobody knew, as they were not labelled. On reference, however, it turned out that they had been deposited in the museum of the Society for sixty years, and that an account of them had been published in the *Archæologia.* I referred to the account which was written by Mr. Frere in 1797, and it appeared that in a brick-field at Hoxne, in Suffolk, at a considerable depth from the surface, these implements were found, associated with the bones of large animals at that time unknown, and associated also with shells, and so great did their antiquity appear that Mr. Frere, in his account, considered that they belonged to a previously existing world. Of course I was very much struck with this discovery of Mr. Frere's, and it was exceedingly gratifying to find these discoveries in the valley of the Somme, so completely borne out by a parallel case in England recorded so long previously. Shortly afterwards, Mr. Franks called my attention to another implement which had been preserved in a collection previously in existence for something like 150 years. It was a pointed stone implement—a species of spear-head—labelled as a British weapon, found with elephants' teeth, opposite the Black Mary's in Gray's Inn Lane. In a letter of Mr. Bagford, dated 1715, in Herne's edition of Leland's Collectanea, it is said to have been found with the skeleton of an elephant. It was supposed to have been used to kill the elephant of Cæsar, but at the present time we are inclined to think that that particular elephant did not belong to Cæsar.

Since that time a number of similar discoveries have taken place in England. Mr. Prestwich, on his return from the valley of the Somme, thought that there must be in England implement-bearing gravels similar to those at Abbeville and Amiens. Amongst others it occurred to him that the gravels in the neighbourhood of Salisbury were likely to produce implements, not only from the extreme similarity of the animal remains in the two cases, but also from the general character of the gravels, and of the valley. He accordingly came to Salisbury for the purpose of searching for some of these implements. Unfortunately, at that time, he was disappointed, although he searched in the brick-field at Fisherton, and I believe, other places along the valley. Since that time, however, owing to the careful observation and perseverance of Dr. Blackmore and other gentlemen of this town, there have been found in those beds of gravel which Mr. Prestwich selected as likely to contain them, a large number of implements, similar in all respects to those of the valley of the Somme. Not only have these been found in the brick-field at Fisherton, but also at Bemerton, Milford Hill, and other places, for the names of which I need only refer you to the cases in this room.

I myself thought of a gravel bed in the neighbourhood of Bedford as likely to produce them. I went down there and searched, but in vain. Subsequently there was a discovery made on the banks of the Thames in the neighbourhood of Reculver, of a number of these implements. I knew Mr. Wyatt, of Bedford, and asked him to accompany me to Reculver. We were fortunate enough to obtain some specimens, and on Mr. Wyatt's return to Bedford, he applied himself more diligently to an examination of the gravel beds in his own neighbourhood. His search was soon rewarded, and there also have these implements occurred in considerable numbers.

In Suffolk, I was visiting the collection of an antiquary, which has since become my own, that of Mr. Warren, of Ixworth. Among his stone implements, I noticed the one which I hold in my hand. I saw that it belonged, not to the neolithic, or surface period, but to the gravel or palæolithic period. I found that it had been discovered among gravel at Icklingham, and I went there in search of more, but found nothing. I applied to the workmen, and employed a person at Bury St. Edmunds to obtain some. He sent me up a number of flints, but I found they were all of natural formation.

In the meantime I had had a plate engraved, showing the different forms of the implements found, and one or two copies of this I sent to my friend at Bury St. Edmunds, to show to the workmen. The result was that in a few weeks another box of flints arrived, containing 50 per cent. of genuine worked flints, found in the gravel at

Icklingham. About the same time, Mr. H. Prigg, of Bury St. Edmunds, diligently set about collecting specimens, and the result of his diligence will be found in some of the cases of this Museum. Similar implements have been found in various other localities: at Lake, and at Fordingbridge, at the latter place by an inhabitant of this town, a gentleman who had visited this Museum, and who while waiting at the Station, observed one or two specimens in the ballast on the line. They have also been found at Hillhead, on the shores of the Southampton Water, by Mr. James Brown, of this town, who has also found them in various localities in the neighbourhood. They have been picked up on the surface of the land in Kent, and other places; and more recently they have been found by Mr. Stevens's son and Dr. Blackmore at Bournemouth.[1] At Thetford, on the borders of Norfolk and Suffolk, and further down the valley of the Ouse they have been discovered in some abundance. On the continent they have been found in various new places. I may mention Vaudricourt near Bethune; Pressigny; the gravel of the Seine at Paris; at Vendôme, and more lately in the neighbourhood of Rome, in the gravels of the valley of the Tiber.

As to the forms of these implements, I have divided them as a convenient method of arrangement, into those which resemble spear heads either of a pointed or oval form; those with a cutting edge all round, which are generally almond shaped; and mere flakes, consisting of a simple fragment of flint struck off from a block. And it is very remarkable how closely analagous in form these implements are, in whatever part of the country they occur. I have here two specimens which can hardly be distinguished from each other. One was found at Hoxne, and the other at Amiens in the valley of the Somme. And it is the same throughout the series. The same forms prevail in all cases wherever these things occur throughout Western Europe. It would appear, therefore, that man having similar wants and similar material for the supply of those wants, was naturally led to adopt similar weapons wherever he was placed.

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[1] Mr. Evans has generously placed at the disposal of the Society woodcuts of some of those implements in the Blackmore Museum, which he has had prepared for his forthcoming work on the Stone Antiquities of Great Britain. They are all drawn to the scale of one half linear measure, and are given in the three plates at pages 11, 12, 16, and in plates A, B, C, D, E, with the names of the localities where they were found. Ed. W. M.

What is still more remarkable is the discovery which has lately taken place in India. There, in the neighbourhood of Madras, is an extensive laterite formation which has generally been regarded as a marine deposit, in which there are beds of gravel. Some members of the Geological Survey, and more especially Mr. Bruce Foote, on examination of these gravels, have found among them certain worked stones, which resemble those which have been discovered in Europe. The material of which they are formed is not precisely the same as we have here, inasmuch as the ordinary flint used in this country does not occur in that part of India. But they have there an indurated sandstone or quartzite which is almost equal in hardness to flint; and the implements which have been found in those beds at Madras, formed of this quartzite, are, I may say, precisely analagous in form to those which occur in western Europe.

I hold in my hand a quartzite implement, found in the neighbourhood of Madras. The other, in my right hand, was found at Thetford. In both cases they are almond-shaped, with rounded butt and with a flat spot on one of the sides, resulting from the manner in which they were chipped, and which possibly was intended to conduce to their use as implements.

Here is another Indian implement, which you will at once recognise as being similar in form to those found in this immediate neighbourhood. Here are some others, also from India, which any one who has seen the cases in this Museum, containing specimens from Bemerton and Milford, would mistake for the same, if they were not formed of a different material.

You have, however, now heard a great deal with regard to the shape and discovery of these implements, and I will, therefore, proceed to say a word or two with regard to the purposes for which they have been used, the stage of civilization which they seem to characterize, and moreover the degree of antiquity which is to be assigned to them.

As to any attempt to show that they are of human origin, at the present day such a thing is needless. Any person who has seen the manufacture of gun flints, or has himself chipped flints, will at once recognise the work of an intelligent being upon the implements which are here before him. But it is not a little satisfactory to find among these implements some which present evidences, not only of having been formed by the human hand, but also of having been used. Up to the present time, we have been hardly able sufficiently to study the various forms and the various degrees of abrasion made upon the edges of these implements. There is, however, a series of them in which there is a certain depression on either side of the point, so as to leave a sort of narrow stem. Here are two specimens, one from Hill-head, and the other from St. Acheul, near Amiens.

They seem to bear evidence of having been used as boring tools. I will not say that they were actually used in that manner, but I think the form in which we now find them is suggestive of their having been so used; and I would beg to direct the attention of those who are more particularly engaged in investigating this subject to these evidences of wear. There are, however, other implements which appear to present even more decisive signs of abrasion by use. Here is one which appears to have been worn away to a straight edge, by chipping upon some flat substance. Here is another with a circular notch, apparently from the scraping of some rounded substance. The sharp edge is actually worn away and polished, in the same manner as a flint-flake is polished, from scraping a piece of bone. It would appear, as far as we can judge from the implements themselves, that they must have been used by the men who formed them for scraping a piece of bone into the form of some implement. We have not, however, up to the present time, discovered any of the bone implements which would appear to have been formed by means of these scraping tools; but I look forward to the possibility of such things being found in the gravel. Among the latest discoveries of Dr. Blackmore, one of these flakes found in the Fisherton brick-earth, bears the most evident traces of having been used upon its edge.

With regard to the state of civilization of man at the time these implements were in use, we have very little indeed to guide us. These seem to be the only remains left us to testify of man's existence. To use the words placed over one of the doors of this Museum, "Time which antiquates antiquities, and hath an art to make dust of all things, hath yet spared these minor monuments." These "minor monuments" are the sole monuments left us of the race of men who at that time inhabited our valleys, and who co-existed here with many animals now extinct. It would appear from analogy, that they must have been men who subsisted principally by hunting and fishing. Whether they were acquainted with the use of fire is still unknown. We have no evidence that they were acquainted with it; but we can hardly suppose, taking into account the evidence we have as to the character of the climate, that they were unacquainted with fire. But in whatever manner they lived, it is quite certain that they had acquired considerable skill in working flints, for some of the implements show a marvellous amount of dexterity in their fabrication. There is a degree of symmetry and skill in the chipping which would puzzle many workers in flint at the present day.

I must now offer some few considerations as to the age to be assigned to these implements.

They must, at all events, be regarded as the earliest known works of man; and we have two methods at command which enable us to obtain some approximate idea as to the antiquity to be assigned to them.

We have, first, the associated fauna: the evidence of the animals which co-existed with man at that time; and secondly, the geological character of the beds in which these implements are found

Now it is a very remarkable thing that in nearly all cases—indeed I may say in all cases with the exception of India, where these implements have been discovered—that they have been found associated with the remains of a certain group of animals. You have the mammoth, or the woolly elephant; you have the rhinoceros tichorhinus (also protected in the same manner by a woolly covering), the hippopotamus, the cave tiger, certain oxen, horses, and other animals, more especially characteristic animals of the drift-beds. Besides the ordinary mammoth you have the elephas antiquus, another species, but how far distinct it is a difficult matter to say. It is, however, generally considered as having specific differences from the elephas primigenius.

Now, it may be, that these animals lived in more recent times than we, at first sight, are inclined to consider possible. The finding of elephants of this particular species, preserved in ice in Siberia, with their skin and flesh still clothing the bones, would appear to give some colour to such a supposition. But, of course, an elephant once imbedded in ice, provided the ice never thawed, would remain there for an interminable lapse of time.

We have, however, evidence that these animals, at all events, were extinct before the valleys had entirely acquired their present forms, or, at all events, before the present valleys had acquired the bed of peat which we so frequently find in them. You may, therefore, suppose that they cannot have lived down to a later period than that at which this clothing of peat in the valleys commenced.

Mr. Prestwich has said that there are no geological reasons why the now extinct mammalia should not have lived down to comparatively recent times: possibly no farther back than 8,000 or 10,000 years; and no doubt it is possible, under certain conditions which were favourable for the existence of large mammals, that they may have lived down to so late a period as that. But we must also look to other evidence than that of the fauna with which these implements are associated, for the means of determining their age; though, no doubt, their association in so many instances with these extinct animals, tends to show us that certainly a great amount of antiquity is to be assigned to them, as no group of animals ordinarily dies out in a short space of time, unless destroyed by man. We therefore fall back upon the geological character and age of the beds in which these flint-implements are found; and as I have already observed, there is a remarkable similarity between the beds of different localities in which these weapons or tools occur, with others in which though flint is abundant, implements have not yet been found. Perhaps the reason for their occurring principally in districts where flint is found is this, that probably no other stone was known, so well adapted for the formation of cutting implements as flint, and therefore that stone became one of the prime necessities of life with these rude peoples.

Of course, these implement-bearing beds of gravel might be, and would have been in former times regarded as the result of some cataclysm, of some deluge, of some wave of translation (of which we heard a few words last night), sweeping over the face of the country and depositing the remains of these extinct animals, which were destroyed by this sudden catastrophe, together with the remains of man who lived at the same time. There are, however, many reasons which show that this cannot, by any possibility, have been the case. For we find these beds of gravel not only in the bottoms of the valleys where they would naturally be deposited by a wave of translation, such as may be supposed to have been required for the purpose, but also on the tops of the hills where they could not by any possibility have been deposited by running water, had the configuration of the ground been the same as at present. You cannot imagine a rush of water carrying with it a large amount of stone, gravel, and sand, leaving that stone, gravel, and sand at the top of the hill instead of at the bottom of the valley. We have, therefore, very good evidence that no great cataclysm, no wave of translation, could have produced the beds in which these implements have been found.

But there is other evidence of such an hypothesis being utterly untenable. If there were any general cause for these deposits being produced in various parts of the country, you would find them in all cases composed of precisely similar materials. On the contrary you find that in each particular valley, the gravels in which these implements occur, consist exclusively of fragments of those rocks through which the rivers running along those valleys flow. Even in valleys situated within a few miles of each other, the rivers of which flow over different geological formations, you will find that the constituent parts of the gravel are different in character. More than that, you find fresh water-shells—the best possible evidence of river action. Still further to show that these beds are due rather to river action than to any general cause, I may mention that you will find them assorted in the way in which rivers sort their deposit. You find the larger stones in one place, the sand in another, the clay and the finer particles in another. I shall of course be told that existing rivers flowing so gently as they do, would not have produced thes results. I quite agree in that opinion, but the evidence afforded b the animals found in these river gravels, tends to show that at tha time there was a much colder climate than at present, and tha during the winter months there was probably a larger amount o rain-fall, or snow, which, during the spring and summer month was set free, giving to the rivers a torrential character, and bestowing upon them a greater power and force to excavate the country ove which they flowed.

But, though you may carry these implements back in point o time, you cannot, by any possibility, carry such as are at presen known, beyond the glacial period, when this country was last submerged, and when a great portion of the surface of the middle an north of England was deposited by icebergs, inasmuch as in som parts of the country where these implements are found, the containing gravels are superimposed upon beds belonging to the glacia period. Again, granting that the valleys have been eroded by th torrential action of the rivers, owing to the climate having bee more severe than at present, we have no means of estimatin exactly the rapidity of the erosion. Certain it is, however, tha the theoretical rapidity of erosion and the severity of the climat must be limited by the conditions necessary for life, inasmuch as w find in the beds half way down the valleys the same animals still i existence. They found means, therefore, to subsist, and the temperature could not have been such as to prevent vegetation fo the support of animal life, at all events in the summer months.

I can only offer some sort of gauge as to the antiquity to b assigned to these beds: the idea that would be formed in our ow minds, standing upon some spot where you may see what has take place since these gravels containing the earliest known works o man were deposited. And I hardly know a better spot from whic to form such an idea than Milford Hill, in the immediate nighbourhood of this city. You have there a hill bounded by a valley o each side, but capped with gravel in which these implements hav occurred. The hill is cut off from the main spur by a kind o transverse valley, showing that at the time the gravel was deposite such a valley could not have existed, or the water would have flowe along it, and not left its deposit on the top of the hill. There is a valley on either side, which, also for the same reason, could not have existed when the gravel was deposited. You must, therefore, when standing at the top of the hill, consider that you are standing on a spot, which, at a remote period, formed the bottom of the bed of the river flowing in a valley, the sides of which have now entirely disappeared; and instead of the sides of that valley, there are now two deep valleys excavated, one on either side, to a depth of 100 feet. How long it would have taken for a river, however torrential in character, flowing over a limited extent of country, such as the Bourne or the Avon, to have excavated a valley a mile, or a mile and a quarter wide, and 100 feet deep, you may have some difficulty in estimating. But that the river, probably with a much larger amount of water than at present, did excavate those valleys since the men existed who formed these implements, may be regarded as a fact which must of necessity be conceded.

As we stand on the top of the hill and gaze on the valleys beneath us, we may feel how vast is the antiquity of the race of men who lived on this spot before these valleys were excavated, though we cannot assign them a date in years, or even in centuries.

At the conclusion of Mr. Evans' most interesting address, a cordial vote of thanks was moved by the Right Reverend Chairman, and endorsed by the whole company. The remainder of the evening was then devoted, partly to listening to a most finished performance of vocal and instrumental music, under the direction of Mr. C. J. Read, wherein the *artistes* were the same as on the preceding evening: and partly to a farther examination of the contents of the unrivalled Museum.

This brought the proceedings to a close, and we can but repeat as we began, that the opening of the Blackmore Museum has conferred upon the city of Salisbury, and county of Wilts generally, a boon which will not soon be forgotten; and that the hearty thanks of all Wiltshiremen are due to the munificent founder in the first place, and then to his indefatigable colleagues Dr. Blackmore and Mr. Stevens.

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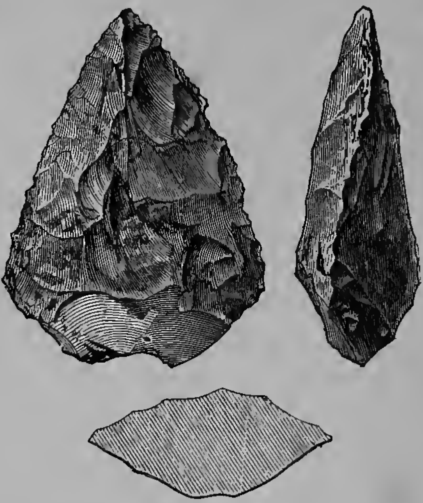
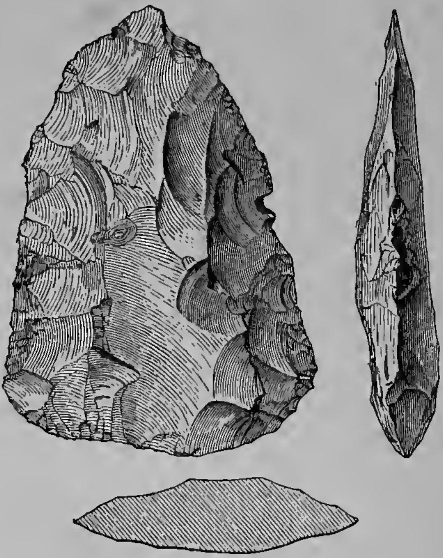
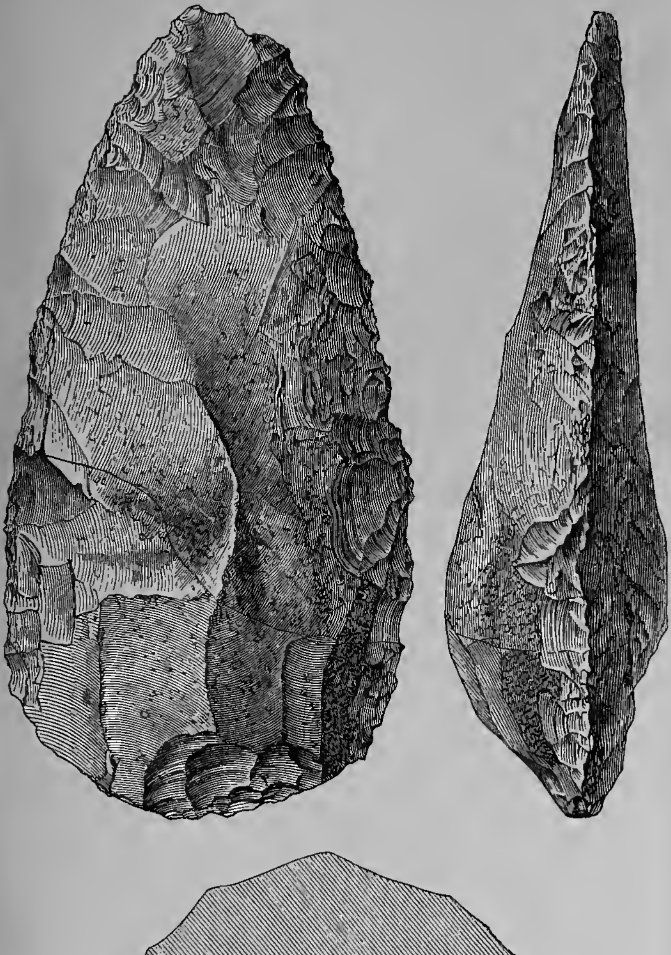


Bemerton, near Salisbury.



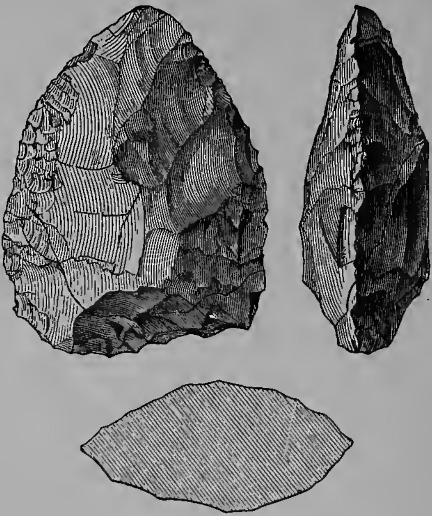
Fisherton brickfield, Salisbury.

B

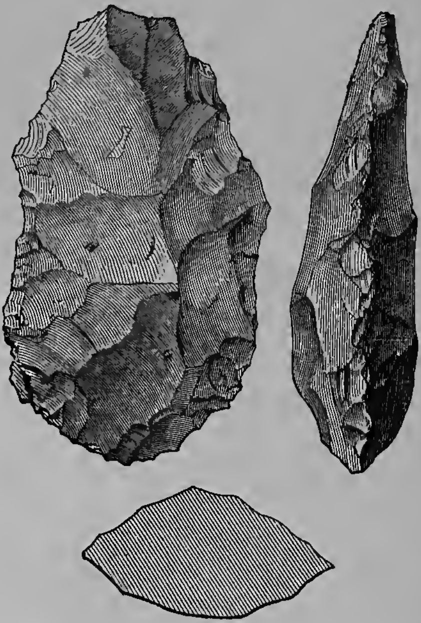


Milford Hill, Salisbury.

C

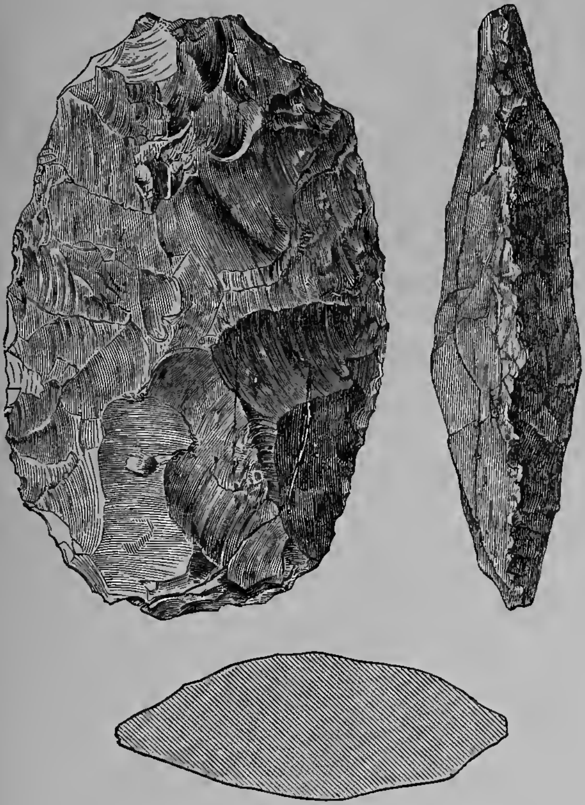


Bournemouth.



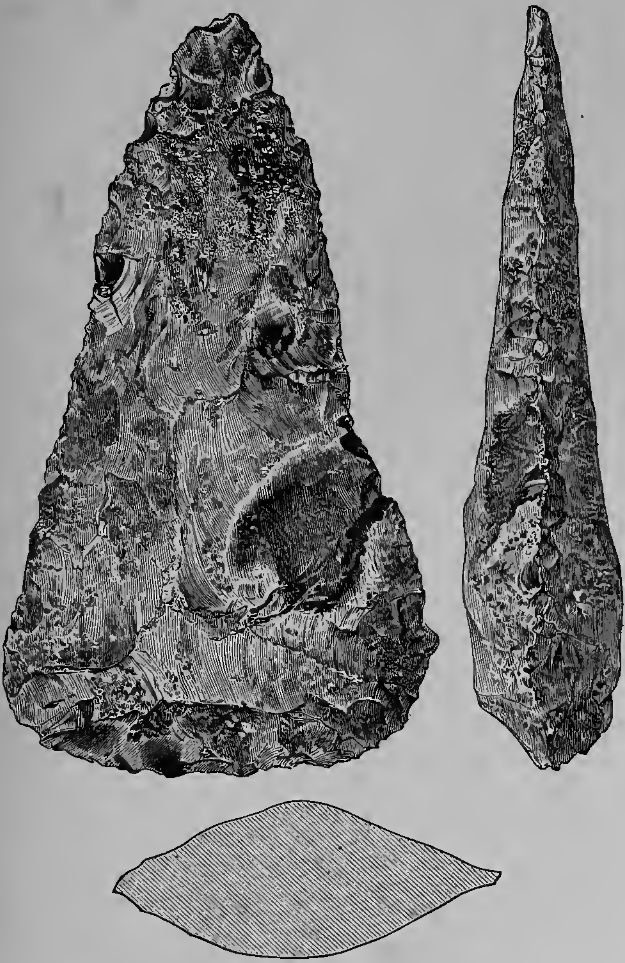
Ashford, near Fordingbridge.

D

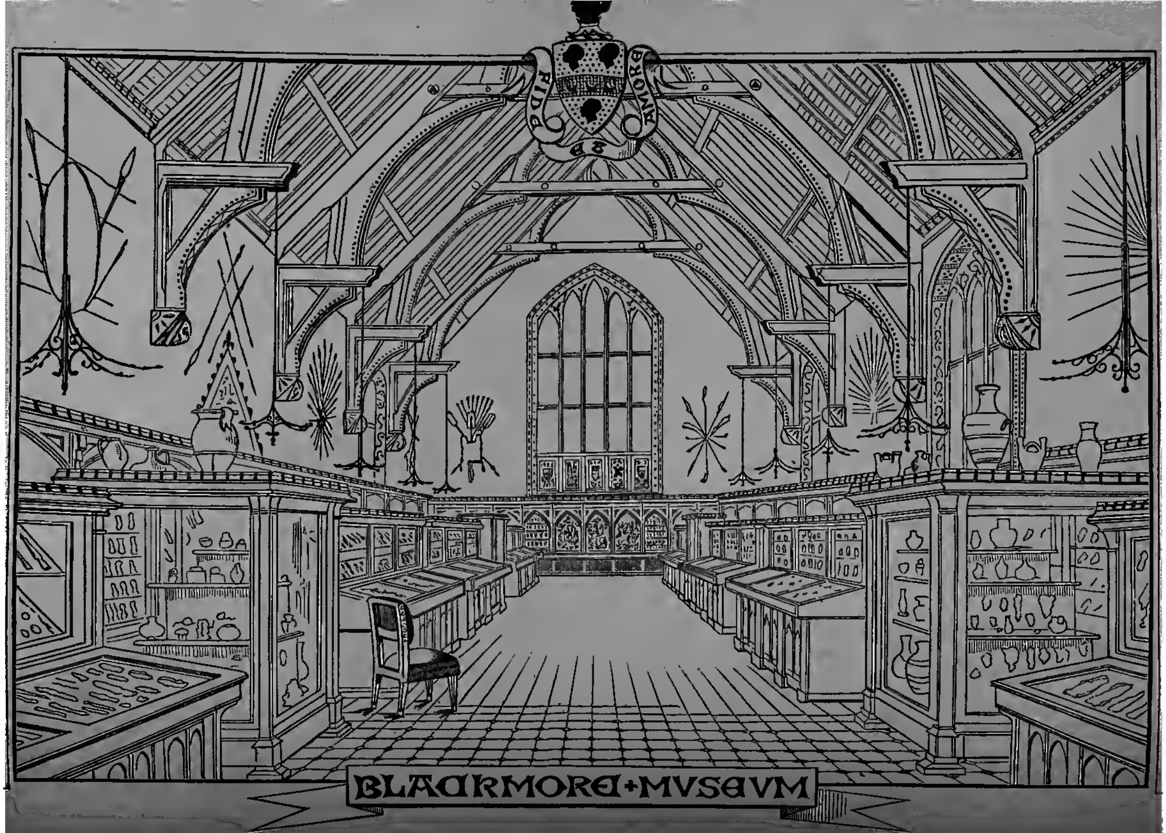


Hill Head, near Fareham.

E



Icklingham, Suffolk.


FIDE ET AMORE
BLACKMORE + MUSEUM

SOME ACCOUNT

OF THE

BLACKMORE MUSEUM.

PART II.

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DEVIZES:
H. F. & E. Bull, 4, Saint John Street.
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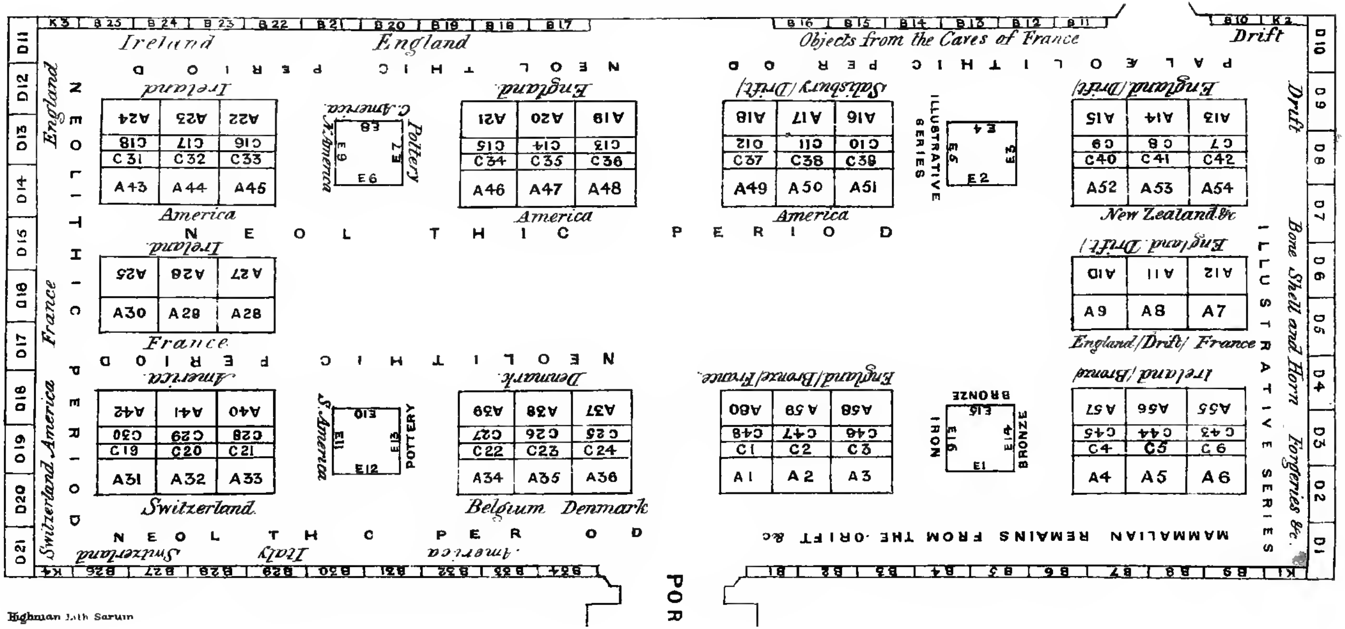
Plan of Cases in the Blackmore Museum.



Highman Lith Sarum

REPORT

OF

The Blackmore Museum.

PART II.

"Time which antiquates antiquities, and hath an art to make dust of all things, hath yet spared these minor monuments."—SIR THOMAS BROWNE.

THE Blackmore collection consists mainly of stone hatchets and other "minor monuments" of that early period, now known as the Stone Age. A period of which so many relics exist in Wiltshire, that Mr. Blackmore could not have selected a more appropriate resting-place for his Museum than our county.

It has been said that "Time conferreth a dignity upon the most trifling thing that resisteth his power," and this may be true enough when the mind is able to appreciate the antiquity of the object in question, clearly, however, many specimens in the collection possess no "dignity" to be seen by ordinary eyes, for several were found upon the turnpike road awaiting destruction from the first passing wheel; one stone hatchet was in use as a whetstone; another as a wedge for a door; and one, with a hole in it, served as a weight to a horse's halter, until it was broken, and thus rendered useless for such a "dignified" purpose. But before we are able to see any "dignity" in a chipped flint, or a piece of polished greenstone, we must learn something of the associations connected with these "minor monuments," and of the habits of the men who wrought them. There appears to be a growing desire to acquire this knowledge; the great difficulty is to obtain elementary works upon the subject; to some extent the present publication will supply this want, for it will necessarily give a general sketch of Pre-historic Archæology, so far as it is illustrated by the Blackmore collection.

No more than a mere outline of this very extensive subject can be traced, matters of detail and finish must be left to be filled in by other and more competent hands; still it will be possible from this sketch to form some idea of the absolute and relative antiquity of pre-historic remains, and to become acquainted with some leading facts throw light upon the habits and customs of pre-historic man. shall then be in a position to appreciate "the dignity" which conferreth" upon these rude tools. We shall then regard th the "minor monuments," almost the only monuments, of wha until quite recently, an utterly unknown past: ray after ray of is being admitted, the total darkness is gone, facts are massing selves into groups, like mountain ranges; wild theory and speculation may still sweep along their crests, but are passing like the morning mist.

Patient, honest, truthful investigation, conducted in a sci spirit and by the use of scientific methods, has already cast flo light upon the more salient points of the pre-historic past; j the sun, before he is visible to our eye, gilds the loftier mou peaks, still leaving the general features of the landscape shr in grey obscurity. Let us then be content to wait, for neithe rise nor noon-day will be withheld from us.

Mr. Blackmore has mentioned[1] that the one great lesson he conceives to be taught by his collection is *progress.*

This *progress* has been retarded, or arrested, in the case of savage tribes, but even the most degraded savages possess we and implements which afford evidence of thought, of contri and of invention. That these inventions are their own, and not received by transmission from others, seems to be proved l frequent occurrence of special forms of weapons and implen which are peculiar to the particular tribes who use them.

Perhaps the greatest discovery of pre-historic times, cons in reference to *progress,* was the knowledge that certain ki grain were nutritious, and that by cultivating them a co supply of food could be obtained. Up to this point, the hunt been compelled to follow the wild animals in their migrations nomad sought fresh pastures for his flocks and herds, whil uncertain supply of food, often resulting in positive famine, li the number of individuals who could subsist in a company.

With the introduction of agriculture all this was changed, a settled mode of life was adopted, and men were enabled to congregate in particular spots without risk of starvation; this naturally led to the sub-division of labour, to the establishment of commerce, and to a general advance in civilization.

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[1] Ante, p. 65.

There is no reason for supposing that men of the earliest (Palæolithic) period used grain for food, neither did they possess domesticated animals; but they appear to have subsisted by hunting exclusively.

The discovery of the use of cereals and the practice of agriculture, seem to have arisen independently in the Old and in the New Worlds; the cereals of the Old World were unknown in America, when it was first visited by Europeans, although maize was found to be extensively cultivated there and was used as an article of food. On the other hand, maize was unknown in the Old World prior to the discovery of America.

The modes of grinding corn show *progress*. The Neolithic people in the Old World, at first appear to have reduced grain to a coarse powder by rubbing it upon slabs of stone (saddle-shaped mealing stones), or by bruising it in shallow stone mortars; subsequently they invented the "quern," which consists of two stones, the upper being made to revolve upon the lower; this quern was, even in its simplest form, an improvement upon the ruder mealing-stones which preceded it. As time went on, the quern underwent many changes in form, indeed the modern corn mill is but an adaptation of the ancient quern, and *progress* has, perhaps, shown itself less in altering the grinding principle, than in the substitution of wind, water, or steam power for manual labour in working the mill.

Progress, however, does not invariably move with equal rapidity, or in one uniform direction; thus, the aborigines of America discovered the use of corn for food and practised agriculture, rendering it possible for indigenous semi-civilization to arise, as in Yucatan and Mexico, but they never hit upon the invention of the quern, and, even at the present time, the primitive stone slab, or the stone pestle and mortar, continue in use for grinding the maize used in making the daily supply of "tortillas," of which so much is heard from travellers. Notwithstanding this, there does not appear to have been a total absence of *progress*, the grinding principle indeed continued unchanged in America; but highly ornate shapes given to the implements, they were covered with carving, or laboriously sculptured into the forms of men or animals.

The very idea of *progress* implies a commencement, a start
point, and, probably, the chipped flint implements found in the
gravels furnish us with this starting-point of human thought
invention. Rude in the extreme as some of these implements
yet even the rudest afford evidence of human thought, and of
adaptation of means to an end. As a tool-and-weapon-using b
man stands alone; "in no case whatever do the lower animal
an implement made by themselves, as an intermediate ag
between their bodily organs and the work which they desire t
Man, on the contrary, is so constructed that in almost everyt
he desires to do he must employ an agency intermediate bet
his bodily organs and the effect which he wishes to produce.
this necessity, which in one aspect is a physical disability, is c
ated with a mind capable of invention, and with certain impl
instincts which involve all the rudiments of mechanical skill.
man who first lifted a stone and threw it, practised an art whic
all probability, is as strictly instinctive and natural to man, as
to a dog to bite, or to a bull to charge. The act involves the
and the knowledge of projectile force, and of the arts by v
direction can be given to that force. The wielding of a sti
perhaps, an act of equally primitive intuition, and from this t
throwing of a stick, and the use of javelins, is an easy and na
transition. Simple as these acts are, they involve both physica
mental powers, capable of all the developments which we see i
most advanced industrial arts. These acts involve the instin
idea of the constancy of natural causes, and the capacity of the
which gives man the conviction that what has happened under
conditions, will, under the same conditions, always happen aga
With man "thought was an instinct, and contrivance was at
a necessity and a delight," and in this lies the whole unmeasu
distance between man and the lower animals.

EDWARD T. STEVENS
(*Hon. Cu*

Blackmore Museum,
October, 1869.

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[1] Duke of Argyle "Primeval Man," pp. 144—149.

THE Collection in the Blackmore Museum is arranged in four groups :—

GROUP I.

Remains of Animals found associated with the works of Man.

GROUP II.

Implements of Stone.

GROUP III.

Implements of Bronze.

GROUP IV.

Implements, Weapons, and Ornaments of Modern Savages, which serve to throw light upon the use of similar objects belonging to pre-historic times.

GROUP I.

The excellent papers read at the Opening of the Museum, by Mr. Prestwich,[1] Mr. Boyd Dawkins,[2] and Mr. Charles Moore,[3] supply general information respecting the beds in which some of the animal remains belonging to this group occur, the conditions under which the river-gravels were deposited, and the distinctive characters of the fauna of the Quaternary, and the Pre-historic periods.

In the collection, Group I. is sub-divided into

A.—*Remains of Animals found in Quaternary deposits.*
B.—*Ditto ditto Bone-caves and Rock-shelters.*
C.—*Ditto ditto Turbaries, &c.*

SECTION A.

Cases A 2, A 3, B 1 to B 6, C to C 3, and E 1.

These cases contain mammalian remains found at Fisherton Anger,

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[1] Ante, part 1, pp. 22—35.
[2] Ibid, pp. 49—57.
[3] Ibid, pp. 36—38.

South Burcombe, and Wishford near Salisbury; Sherborn Dewlish, Dorset; Fordingbridge, Hants; Erith, Kent; and at places in the counties of Sussex, Bedford, and Cambridge.

Remains of the following animals, obtained from the brick at Fisherton, are shown:—

Cave Lion *(Felis spelæa).*
—— Hyena *(Hyæna spelæa).*
Fox *(Canis vulpes).*
Wolf *(C. lupus).*
Urus *(Bos primigenius).*
Aurochs *(Bison priscus. B. minor ?)*
Musk-sheep *(Ovibos moschatus).*
Reindeer *(Cervus tarandus).*
Red Deer *(C. elaphus).*
Horse *(Equus fossilis. E. caballus).*
Rhinoceros *(R. tichorhinus).*
Mammoth *(Elephas primigenius).*
Pouched Marmot *(Spermophilus superciliosus?)*
Lemming *(Lemmus torquatus).*
Lemming *(———— sp.)*
Hare *(Lepus timidus).*

Remains of the undermentioned animals are exhibited from Quaternary deposits in France and England.

Hippopotamus *(H. major).*
Elephant (*Elephas meridionalis, and E. antiquus.*)

The only objects which require special notice, are some bone skeletons, of a species of pouched marmot, and of two species of ming; no remains of either of which animals have hitherto observed in beds of this age in England. At one spot in the l earth at Fisherton, remains of this marmot were found in abund in some instances the bones were still articulated, and showed these little animals had perished, whilst coiled up in the usual tude of hibernation. Possibly some exceptionally high spring destroyed them in their winter retreat, before the sun's ray sufficient power to arouse them from their long sleep.

Remains of upwards of fifty of these marmots have been disco at Fisherton, and, as very many were found within a few feet of each other, it is probable that the fossil species was social in its habits, like the *Spermophilus Parryi* of the present day.

The Fisherton spermophile is probably of the same species as that obtained by Professor Kaup from the Eppelsheim sand, and described by him under the name of *Spermophilus superciliosus.* M. Pomel has also obtained the same species from Condes, Puy de Dome. And the late Dr. Falconer[1] has described a lower jaw of *Spermophilus* from the bone caves of the Mendip Hills, Somerset, under the provisional name of *S. erythrogenoides,* on account of the close resemblance of the fossil jaw to that of a recent Asiatic species (*S. erythrogenys*). This, however, may prove to be identical with Kaup's *S. superciliosus.*

The Fisherton spermophile, or pouched marmot, was about the size of a squirrel; the incisors are strong, rounded anteriorly, and slightly flattened on the inner lateral surface; the molars are simple, the roots being long and distinct. The crown of the first upper molar consists of a single sharp transverse ridge; that of each of the remaining four is divided transversely by a deep valley bounded by two sharp ridges, which terminate externally in two pointed processes, and internally in a single rounded tubercle.

In the lower molars the transverse valley is wider, and not so central; the anterior ridge is notched, and more elevated than the posterior one. Both upper and lower molar teeth gradually increase in size from before backwards, the first being the smallest and the last the largest of the series. In old individuals the thin coating of enamel is worn away at the more salient points. The nasal bones are rounded anteriorly; the frontal is flattened above, and slightly depressed between the well-marked superciliary ridges, which are elevated, and form posteriorly strong postorbital processes. The parietal is a single bone; the suborbital foramen is round. Judging from the size of the orbit, the eyes must have been large. The clavicles are strong, and well developed; the humerus measures 1 inch 4½ lines in length. From the size and shape of the last, or unguial phalanx, the animals must have been armed with sharp claws.

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[1] Palæontological Memoirs, vol. ii., p. 452.

Of the many spermophiles still living in the northern p British America, *S. Parryi*, *S. Douglassii*, *S. Richardsoni*, *Franklandi* are nearly allied to the fossil; they all, however, p marked points of difference and in no case are the superciliary ric raised or strongly marked. The teeth of *S. Richardsoni* bear a resemblance to those of the fossil than any other North Am species, and have the transverse ridges in the upper molars well m but the general appearance of the skull is much more slende frontal bone is only slightly convex between the orbits, a zygomatic processes are narrower, and curved more backwards

Certain Asiatic species are more nearly allied to our Fis spermophile than those from America. The superciliary are well developed in *S. erythrogenys*, *S. mugosaricus*, a *concolor*.

S. concolor is rather smaller than the fossil; the outline skull is more curved, and the superciliary ridges are much The teeth are very similar, but the transverse ridges in the molars are not so prominent.

S. mugosaricus.—The superciliary ridges are as well develop elevated as in the fossil; the frontal is also concave betwe orbits, and the post-orbital processes are strong and curved wards: the palate is rather narrower. The upper molar tee slightly narrower, and the transverse ridges are not so prom The first upper molar is notched.

S. erythrogenys.—This is the species which upon the whol closely resembles the fossil, and may eventually prove to be variety of it. The superciliary ridges are rather less elevate zygomatic arch at its junction with the malar bone is narrow the parietal bones are more convex laterally. Both upper and teeth are very like, but are rather smaller in *S. erythrogenys* t the fossil. This is a Siberian species, and is found inhabiti Altai mountains. In general appearance and colour it is ve a small rabbit with a long tail; the Souslik (*S. concolor*), other hand, in point of colour resembles a hare.

Of the two Fisherton lemmings, the larger species is identical with an animal still living in Siberia, and described by Pallas under the name of Ringed lemming (*Lemmus torquatus*), on account of a pale brown mark or ring round its neck. There is a good recent skull in the British Museum, with which the present fossil has been compared, and found to agree. This species has been recently discovered by Mr. J. W. Flower, F.G.S., in the bone cave known as Wokey Hole, Somersetshire.

The remains of the smaller species[1] correspond in size with the Norway lemming (*Lemmus Norvegicus*), but differ from it in the form and arrangement of the molar teeth. The bones of the fossil belonged to an animal rather larger than our common field vole (*Arvicola agrestris*), for the remains of which it might at first sight have been easily mistaken. A constant and well-marked difference, however, exists in the second upper molar tooth, which in the fossil is composed of only four triangular cemental spaces instead of the five always present in the field vole; the lateral angles are rather more acute, and in the third lower molar are more prominent on the outer side than in *A. agrestis*.

The following is the dentition of the fossil:—

The upper incisor teeth are broad and flat on the inner side.

Upper Molar Teeth.—The first is composed of five triangular cemental spaces, and has three ribs or angles on each side. The second has six cement spaces, with two internal and three external angles. The third has six cement spaces; the two last are confluent, and not triangular, but like the figure 6 reversed. There are four angles on each side.

Lower Molar Teeth.—The first is composed of nine cemental spaces, the three first of which are confluent; it has six internal and five external angles. The second has five cement spaces, and three angles on each side. The third has only three cement spaces and three angles on either side.

Both upper and lower molar teeth are entirely without roots.

The palate is relatively narrower and more deeply grooved; the lower articular surface of the humerus is also broader, the in condyle more prominent, and the deltoid crest extends lower in the fossil than in the vole.[1]

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[1] Recent discoveries show that this species is not a true lemming, but a vole belonging to the subgenus *Praticola* of M. V. Fatio.

Two fragments of egg-shell, obtained from the brick-ea Fisherton, are shown. The smaller corresponds in size to a si fragment of an egg of a wild duck (*Anas boschas*); the larg that of a wild goose (*Anser palustris*). These two specime the only fossil egg-shells hitherto met with in this county i Quaternary deposit.

The following land and fresh water shells found in the Fish brick-earth, are exhibited.

LAND SHELLS.

Succinea putris
,, *elegans*
,, *oblonga*[2]
Helix arbustorum
,, *nemoralis*
,, *pygmæa*
,, *pulchella*

Helix hispida
,, ,, *var. concinna*
,, *rotundata*
,, *fulva*
Pupa muscorum
Zua subcylindrica

FRESHWATER SHELLS.

Ancylus fluviatilis
Lymnæa palustris
,, *limosa*
Planorbis spirobis
,, *carinatus*
Bythinia tentaculata

Valvata piscinalis
Pisidium fontinale
,, *pulchellum var.* (*Je*
,, *pusillum*
,, *obtusale*

A series of land, fresh water, and marine shells, found in a lar geological deposit at Menchecourt, in the valley of the So France, is shown; they consist of—

LAND SHELLS.

Limax agrestis
Helix arbustrorum
Vitrina pellucida
Pupa muscorum juv?

Helix —— *sp.*
,, *pulchella*
,, *pygmæa*
Cyclostoma elegans

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[1] "Guide to the Blackmore Museum," part 1, pp. 22—25.

[2] This is the only shell not found living in the neighbourhood.

FRESHWATER SHELLS.

Lymnæa limosa
„ *palustris*
Velletia lacustris
Planorbis carinatus
„ *spirobis*
„ *vortex*
Bythinia tentaculata
Bythinia ventricosa
Valvata piscinalis
„ *cristata*
Cyclas rivicola (?)
„ *cornea*
Pisidium pulchellum

MARINE SHELLS.

Buccinum undatum
Litorina rudis
Litorina —— *sp.*
Tellina solidula
Hydrobia marginata

SECTION B.

Cases B 7 to B 9, C 4, and C 5.

These cases contain remains of animals obtained from bone-caves in central and southern France, and in Gibraltar; among them are bones and teeth of—

Cave Bear	(*Ursus spelæus*)	Caves of the Pyrenees.
„ Hyæna	(*Hyæna spelæa*)	Ditto
Spotted Hyæna	(*H. crocuta*)	Caves, Gibraltar.
Wolf	(*Canis lupus*)	„ Pyrenees.
Fox.	(*C. vulpes*)	„ „
Rhinoceros	(*R. tichorhinus*)	„ „
Horse	(*Equus fossilis. E. caballus.*)	Caves of Dordogne.
Urus	(*Bos primigenius*)	„ „
Ox	(*B. taurus*).	Caves of the Pyrenees.
Reindeer	(*Cervus tarandus*)	Caves of Dordogne.
Fallow Deer	(*C. dama var. barbarus*)	Caves, Gibraltar.
Red Deer	(*C. elaphus*)	„ „
Goat	(*Capra hircus*)	Caves, Pyrenees, and Gibraltar.
Ibex	(*C. Ægoceros*)	Gibraltar.
Sheep	(*Ovis sp.*)	Pyrenees.
Pig	(*Sus scrofa*)	Pyrenees.
Black Rat	(*Mus rattus*)	Gibraltar.
Rabbit	(*Lepus cuniculus*)	Ditto

As might be expected, there is a considerable difference antiquity of remains found in caves. The objects shown Paris Exhibition (1867), from the caves of France, were cla three groups according to their supposed relative antiquity. be sufficient for the present to mention, that remains of the r are more abundant in caves of the second, than in caves earlier period. There is a total absence of polished stone ments in cave deposits of the first and second periods, in which remains of the mammoth and other extinct mammalia Many of the objects found in the Gibraltar caves cannot be r to a very early period.

SECTION C.

Cases A 4 to A 5, C 6, H 1 and H 2,

Contain bones of animals found in turbaries in Cambridg Bedfordshire, Berkshire, and Wiltshire, including remains of-

Urus *(Bos primigenius)*.
Ox (*B. longifrons*).
Red Deer (*Cervus elaphus*).
Roe Deer (*C. capreolus*).
Wild Boar (*Sus scrofa*).
Horse (*Equus caballus*).
Sheep (*Ovis sp.*)

The animal remains from the sites of the Swiss lake-dw and from the Highfield "pit-dwellings," are not exhibite want of space. Both series are very extensive and it is hope at some future time, they may be rendered accessible to the

GROUP II.

Implements of Stone.

The stone implements in the collection are arranged divisions, and are assigned to two periods, the Palæolithic stone-period, and the Neolithic or new stone-period.[1]

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[1] This only applies to the European specimens. Our acquaintance stone implements of Asia and Africa is at present very imperfect, and reason for supposing that the stone implements of America do not enti into the above classification.

PALÆOLITHIC PERIOD.

To this period belong the flint implements found in the clay, sand, and gravel beds of the Quaternary drift, as well as those met with in certain bone-caves. The implements are formed by the simple process of flaking. No specimens show artificial rubbing or polishing.

Implements of the Palæolithic period are found associated with remains of animals, many of which, such as the mammoth, are extinct; whilst others, such as the reindeer and the musk-sheep, have migrated to colder regions. From the character of the fauna of the Palæolithic period, it is evident that a considerable amelioration in the climate of Western Europe has taken place, since the flint implements found in the St. Acheul and Salisbury river-gravels were fashioned.

NEOLITHIC PERIOD.

During the Neolothic period, some flint and stone implements were finished by artificial rubbing. Most of the typical Palæolithic forms of implements are missing in the Neolithic period, but they are replaced by a number of new and characteristic types, none of which are found associated with remains of the mammoth, or any other of the extinct mammalia of the Quaternary period. With the new forms of implements, new species of animals, such as the *Bos longifrons*, and the sheep occur. Very few animals appear to have been domesticated during the Neolithic period. Although the potter's art was practised, there is little, if any, evidence of the use of the potter's wheel during this period. Cereals, and flax were cultivated; a coarse kind of bread was made, and the arts of spinning and weaving were known.

Many savage tribes are still living in their Neolithic period; some have only emerged from it within the memory of man, whilst others were passing, or had but recently passed, into their Metallic period, when first brought into contact with Europeans. Very many savages at the present time still use implements of bone, shell, or stone, for all the ordinary purposes of life, and are wholly unacquainted with metallurgy. It is this use of stone, or bone, to the *exclusion* of metals[1] which is the characteristic of both periods of the Stone age. Many stone implements were in use during the Bronze and the Iron periods, indeed many stone implements are still used by highly civilized people, and are so used, because the material is the substance best adaped for the purpose to which it is applied. There are, however, usually typical distinctions between the stone implements of the Stone period, and those of the Metallic periods, and as our knowledge extends, these distinctions will probably be better understood.[2]

PALÆOLITHIC PERIOD.—DRIFT SERIES.

Flint implements from the drift beds of England and France, are shown in the cases A 6 to A 18, B 10, and D 8 to D 10.

Mr. Evans has made a general classification of these objects as follows :—

1. Flint flakes—apparently intended for arrow-heads and knives.
2. Pointed weapons—some probably lance or spear-heads.
3. Oval or almond-shaped implements—presenting a cutting edge all round.[3]

Recently some new types of drift-implements have been found, and no doubt Mr. Evans, in his forthcoming book will modify the above classification. Until a fresh nomenclature has been adopted, it may be well to mention what these new forms of drift implements are, and in what respects they differ from the pointed (pear-shaped) weapons and the oval or almond-shaped implements of Mr. Evans.

One characteristic of the pointed or pear-shaped implements is their *not* having a cutting or sharp edge all round; the broad end of the implement is left as a rounded butt, apparently to adapt the object for use in the hand. A characteristic, on the other hand, of the ovoid and oval implements is, that they have no such butt; they present a sharp edge all round.

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[1] Native metal, such as copper or meteoric iron, is frequently used, during their Stone age, by races who simply treat this substance as a hard variety of stone, and either rub or hammer it into the required shape.

[2] Drilled stone axes appear to belong to the Bronze period, as well as stone "gorgets," and several varieties of whetstones. Other whetstones belong to the Iron period. There is also much difference in point of workmanship between stone objects of the Stone, and stone objects of the Metallic periods, particularly as regards the drilling of axes and hammers.

[3] Archæologia, vol. xxxviii. See ante, part i, p. 96.

Implements of a *heart-shaped* form[1] have been found in the drift, which in outline do not differ much from the pear-shaped implements, except that they are relatively broader and shorter, but they differ wholly from them when seen in section, as they *have* a cutting edge all round.

Another class of implements has also been obtained from the drift; they are *shoe-shaped,* and have a flat under side, the general form of the implement resembling that of a shoe, sloping up to the instep.

A third class of implements consists of *scrapers;* flint flakes of a semi-lunar form, the straight side of which is broad, probably to adapt them for use in the hand, whilst the curved edge is more or less blunted by a series of blows, apparently administered in order to substitute a scraping for a cutting edge.

The specimens exhibited from the drift in the Blackmore collection are classed as follows:—

1. Flint-flakes—some of which show subsequent chipping at the edges.
2. Scrapers—flint flakes of a more or less semi-lunar form, left broad at the straight side, and with the curved edge blunted by a series of purposely administered blows, in order to give a scraping rather than a cutting edge to the implement. Other scrapers, approaching the neolithic forms, have also been found in the drift, and are shown in the collection.
3. Pointed or pear-shaped implements—having, in typical specimens, a rounded butt, a sharp edge at the sides, and a pointed end.
4. Shoe-shaped implements—in typical specimens perfectly flat on the under side, and on the upper side rising towards the centre in the form of a shoe, the thick end (heel) almost unworked, the sides and the rounded point (toe) brought to a sharp edge. These implements may have been used as adze-blades, the flat side resting upon a corresponding flat

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[1] The lower figure, plate A, part 1, is a typical heart-shaped implement.

portion of the wooden handle, a mode of hafting frequently adopted by modern savages. Some of the shoe-shaped implements have been much used, so much so as to alter the general form of the edge, which instead of being narrow and rounded, has become broad and straight.

5. Discoïdal implements—very coarsely worked; in typical specimens nearly circular, very thick in the centre, and brought to an edge all round; they differ in form and in workmanship from the oval implements, and may have served as missiles.
6. Oval implements—having a sharp edge all round, and in section thickening towards the middle.
7. Heart-shaped implements—in typical examples having a sharp edge all round, but in some cases presenting in section a thickening towards the broad end rather than towards the middle, as with Class 6. If any of the drift implements were employed as spear-heads, it is probable that some of these heart-shaped implements were so used.

The question of the antiquity which may be assigned to the drift implements, has already been considered.[1]

DRIFT IMPLEMENTS FROM FOREIGN LOCALITIES.

The implements shown from the "drift" of France, were chiefly obtained from the beds at St. Acheul, St. Roch, and Abbeville, in the valley of the Somme; and from Vaudricourt, near Bethune, in Picardy. Some implements of drift type from Poitou, were found upon the surface soil; not imbedded in the drift.

Among the most interesting specimens exhibited are some implements of quartzite obtained from the laterite deposits of Madras. The resemblance in form between these and the drift implements of western Europe, has been pointed out by Mr. Evans.[2] Some of the East Indian examples have a square chisel-like edge, produced by bold flaking in the mannner already described.[3] This kind of edge is characteristic of the so called axes found in the Danish Kjökkenmöddings, but instances of drift implements possessing it are rare; a specimen, found in the Quaternary beds at San Isidro, near Madrid, of which a cast is exhibited in the Blackmore Museum, however, has this kind of edge; in fact, the implement is in form nearly the counterpart of a specimen shown from the laterite bed, gorge of the Nagerry river, Madras.

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[1] Ante, part 1, pp. 29—103. [2] Ante, part 1, p. 97.

[3] Ante, part 1, p. 11.

DRIFT IMPLEMENTS FROM ENGLISH LOCALITIES.

Cases A 9 to A 18, B 10, D 8, and D 9.

Flint implements are shown from the valley-gravel of the Lark at Warren Hill, Mildenhall, Bury St. Edmunds, and Icklingham; from that of the valley of the Little Ouse at Shrub Hill, Broomhill, and Santon Downham, near Brandon; and at Red Hill and White Hill, Thetford; from the valley of the Ouse, at Biddenham, near Bedford; from the drift of the Hampshire coast near Fareham; from the drift-gravel of the Avon valley at Lake, and Milford Hill, near Salisbury; and from that of the Wylye valley at South Newton and Bemerton, near Salisbury; from the gravel of the Avon valley at Ashford near Fordingbridge; and from the sheet of gravel which caps the cliffs at Bournemouth.

The discovery of flint implements in the drift of the Somme valley, about thirty years since, by the late M. Boucher de Perthes, has already been mentioned.[1] We can have no better historian of the investigations which resulted from this discovery than Mr. Evans, for he was most actively engaged in nearly everything that subsequently took place; not only did he personally find implements *in situ* in the drift of France and England, but he it was who re-discovered, in the rooms of the Society of Antiquaries, the drift implements found at Hoxne, Suffolk, by Mr. Frere, so long ago as at the end of last century. It was in 1859, that Mr. Prestwich, Mr. Evans, and other English geologists went to Amiens, and were enabled to satisfy themselves of the genuine character of the flint implements found by M. Boucher de Perthes, and the importance of the discovery in its bearing upon the antiquity of man. About four years later, in

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[1] Ante, part 1, pp. 93—96.

September, 1863, after much patient looking and waiting, implements were found in the drift near Salisbury, by Dr. Blackmore. He obtained the earlier specimens from the gravel at Bemerton, but in April, 1864, he met with some in the gravel on the opposite side of the Avon valley, at Milford Hill, and in July in the same year, he found others in the brick-earth at Fisherton, actually beneath remains of the mammoth. It would appear, however, that an implement was obtained from the drift of Salisbury long before this, although no exact record of the circumstances under which it was discovered has been preserved. This specimen which is labelled "Salisbury, 1846," was given to the late Dr. Woodward of the British Museum, who put it aside, as it had little reference to his own special studies; it is now in the collection of Mr. Prestwich, and was lent by him to Mr. Cunnington, who exhibited it at the Salisbury meeting of the Wiltshire Archæological and Natural History Society, September, 1865. It may be worth mentioning that this specimen, both in type and condition, is quite unlike any of the implements since found in the neighbourhood of Salisbury.

The exhibition of Dr. Blackmore's specimens in the Salisbury and South Wilts Museum, then but recently established, produced a rich harvest in its results. In 1865, Mr. Tiffin, Jun., of Salisbury, found a drift implement at Lake, in the Avon valley, about six miles above Salisbury. In the following year, Mr. Toomer, of Salisbury, found some specimens lower down in the valley, near Fordingbridge; and in 1868, Mr. James Sidford found a drift implement at South Newton, in the Wylye valley, about five miles above Salisbury. The earliest discovery of flint implements in the drift of this part of England, however, was made by Mr. James Brown, of Salisbury, in May, 1863, who found a number of specimens upon the Beach at Hill Head, near Fareham, no doubt derived from the drift which caps the cliffs along this part of the coast. In 1867, these discoveries were extended by Mr. Codrington, who found a flint implement in a corresponding deposit upon the coast of the Isle of Wight; whilst in 1866, Mr. Alfred H. Stevens, of Salisbury, ascertained that the drift which caps the cliff at Bournemouth, also contained flint implements; and within the present year this series of coast discoveries has been extended by finding flint implements in the gravel, near the Cemetery at Southampton. All the localities mentioned in this local list are represented in the Blackmore Collection, with the exception of the Isle of Wight, and Southampton.

PALÆOLITHIC PERIOD.—CAVE SERIES.

Cases B 11 to B 16, and C 10 to C 12.

A general notice of the remains found in caves, associated with bones and teeth of the mammoth and other extinct mammalia, has already been given by Mr. Evans.[1] The cave series in the collection consists chiefly of objects, and casts of objects, obtained from some caves and rock-shelters, which exist on the banks of the Vézère, Dordogne, France. The different stations have been classed according to their supposed relative antiquity.

1. Le Moustier, Dordogne.
2. Gorge d' Enfer, Dordogne. Aurignac, (Haute Garonne), and Rebinac, (Basses-Pyrénées), from which specimens are shown in the collection, belong to this period.
3. Les Eyzies, Dordogne. La Madelaine, Dordogne.
4. Laugerie, ditto

Artificial rubbing does not occur upon any of the flint tools found in these caves; remains of a fauna nearly identical with that of the drift abound in them, but no trace of any domesticated animal has been observed.

The flint implements found at Le Moustier, and the Gorge d' Enfer are very drift-like in their forms. In particular some broad flint "scrapers" from Le Moustier closely resemble those obtained from the drift, and also some in present use by the Esquimaux, examples of which may be seen in the collection. The modern Esquimaux tool is usually made of bone, or of stone lashed to a broad back-piece of bone.

Although so many sculptural animal figures and worked bone objects have been met with in most of the Dordogne Caves, not a single specimen has been found in Le Moustier; bones of the reindeer are also less dominant there numerically than at the other stations. Remains of the mammoth have been found at Le Moustier, the two Laugeries, La Madelaine, and Les Eyzies, and worked ivory at Les Eyzies and La Madelaine.

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[1] Ante, part 1, pp. 87—92.

Among the sculptured representations of animals in the collection from the Dordogne caves, are mammoth, reindeer, red deer, aurochs. and horse. There is also the outline of a human figure from La Madelaine.

It is singular that, except at La Madelaine, none of the bones appear to have been gnawed by beasts of prey. The cave-people, therefore, either occupied these caves permanently, at all seasons of the year, or else they possessed some method of closing them when deserted, so as to exclude the carnivorous animals which would otherwise have been attracted by the vast accumulation of bones, &c., left in them.

There is almost a complete absence of the backbones of ox and horse at the stations. It is probable that these animals, after having been killed by the aboriginal huntsmen, were cut up on the spot, and that only the extremities, with their fleshy parts, and the marrow bones, were carried away. At Aurignac, also, the vertebræ of rhinoceros, aurochs, and horse are absent. The backbones of the smaller animals, such as the reindeer, are abundant in the Dordogne caves, rendering it probable that the carcases of these were carried there entire. The heads of animals appear to have been taken, probably for the sake of the brain, as they are all broken, the fragments only remaining.

That the cave-folk of Dordogne prepared the skins of animals, probably to serve as clothing, is evident from the presence of such a large number of flint tools, which have been used for scraping fat from the hides. But whether brain was employed in dressing the skins, as with the prairie Indians of America, is of course uncertain; perhaps the brain was extracted merely to serve as an article of food. There appears to have been a marked resemblance between the habits of the cave-people of Dordogne, and those of the modern Esquimaux, the latter people, as we know, make their clothing from the dressed skins of the reindeer, which they sew together very neatly with sinew thread, using bone needles, less neatly made than those shown in the collection from the French caves; but whether the ancient cave-people prepared skins like the Esquimaux, without using brain in so doing, will probably always remain a matter of conjecture.

The broad flint scrapers, already described as being characteristically present in the drift, and in the cave of Le Moustier, are replaced in caves of the later periods by scrapers of the type of fig. 1, which is engraved of the natural size. Fig 2. represents the flint, natural size, mounted in a modern Esquimaux skin-scraper, in the collection; this flint is absolutely identical in form with those found in the Dordogne caves and elsewhere. The handle of fig. 2 is of wood, having a depression at the side for the thumb of the right hand; at the top are two grooves for the first and second fingers, the third and fourth were doubled beneath the implement, in a hollow made to receive them; as shown by figs. 3 to 5, which represents the complete Esquimaux tool, upon a reduced scale. The implement was pushed forward by the palm of the hand, and had a planing action.

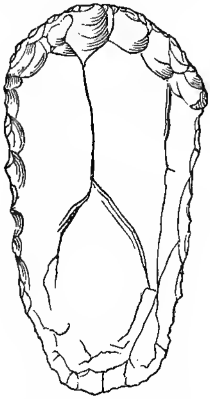

Fig. 1. Cave of Les Eyzies.

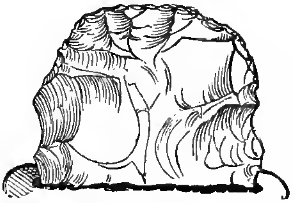

Fig. 2. Esquimaux (modern).

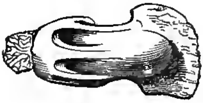

Fig. 3.

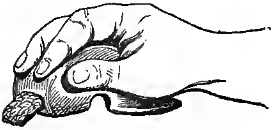

Fig. 5.

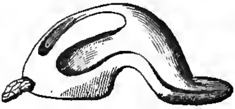

Fig. 4.

Hitherto no ancient handles of scrapers, such as that represented by figs. 3 to 5, have been discovered; if we suppose them to have been made of wood, like the specimen in the Blackmore collection, their absence is at once explained—they have perished; but the Esquimaux frequently use ivory for the purpose, and had such been made by the cave-people, they, in common with the other other sculptured bone and ivory objects, should have reached our time.

The objects found in the caves and rock-shelters of Dordogne and Bruniquel (Tarn et Garonne), display an artistic treatment attained during the Paleolithic period, for any evidence of which we look almost in vain elsewhere. It is therefore, highly interesting to find, that the anatomical peculiarities of the cave-people of Dordogne are no less striking. From a very careful examination of some human remains found in the cave of Les Eyzies, Professor Broca has come to the conclusion, that "the race of Les Eyzies is essentially different from any other race, ancient or modern, that we have ever seen or heard of." They were tall, and, judging from the length of one femur, one of the individuals, an old man, must have been more than six feet in height. Their strength was in proportion to their stature, the old man's femur "exceeded in breadth and thickness all those with which I (Professor Broca) have been able to compare it. In the case of the two men, but in that especially of the old man, the rough surfaces for the origins of muscles are strongly marked, and denote a development remarkable for physical force."[1]

The skulls are of remarkable capacity—that of the old man measures 1,590 cubic centimètres, the crania have besides a great frontal development, which would lead us to think favourably of the intelligence of these Dordogne cave-folk.

"The form of the skulls is very dolichocephalic—contrary to the opinion of those who still admit, with Retzius, that all the autochthones of Europe were brachycephalic. This dolichocephalism is not due to the *narrowness* of the crania, but to their *length.* The sutures in the three crania examined "present certain obliter-

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"[1] Trans. Int. Con. Prehis. Archæol." 1868, p. 171.

ations, the result of advancing years." * * * "the effacing process, instead of passing from behind forwards, as is the case in civilised races, proceeds in the contrary direction," as with all living savage races. "The superciliary ridges of the two men are greatly developed, the root of the nose is much depressed; the forehead is large, vertical, and arched—especially in the median line. The temporal regions are not particularly prominent." The face in its *ensemble* is very broad in proportion to its height.

The lower jaw has a projecting chin, "the development in breadth of the ascending ramus of the jaw is truly excessive. It is greater even than in the Australians and the New Caledonians. In this particular respect, the jaw of Les Eyzies finds its place between the most inferior of living races and the anthropomorphic apes. But in all its other traits it presents, on the contrary, an exaggeration of the characters which distinguish man from the ape."[1] The concluding remarks of Professor Broca are very interesting:—"The Troglodytes of Les Eyzies were barbarians, in common with all the human kind of their day; * * * but they were intelligent and perfectible; and whilst continuing their struggle against nature and against their fellow-men, they managed to leave themselves sufficient leisure to increase their knowledge, to develope their industries, and even to elevate themselves to the cultivation of the arts. Such precious aptitudes, rare in all times, but truly extraordinary in regard of the period in which they were manifested, could only result in favour of an advance in cerebral organisation, such as that which has found a morphological expression in the skulls of the race of Les Eyzies." Engravings of the three skulls have been published in the "*Reliquiæ Aquitanicæ*," impressions of these engravings are shown in the cases in the Blackmore Museum, and casts of the skulls are preserved in the Christy collection, London.

NEOLITHIC PERIOD.

Flint and stone implements and weapons belonging to this period, are shown from various parts of England, Ireland, Scotland, France, Switzerland, Belgium, Denmark, and Italy. A few specimens found in Egypt, Africa, and the East Indies, as well as a nice series from the peninsula of Sinai, are included in the collection. The stone objects from North and South America and the West Indies, fill several cases; among these are some of the most interesting specimens in the Museum.

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[1] P. Broca *l. c.* p. 172.

Although one of the characteristics of the Neolithic period is the presence of artificial rubbing upon *some* of the stone implements, a very large number were still fashioned, like those of the Palæolithic period, wholly by flaking and chipping; indeed, with the exception of the hatchets, axes, and some forms of hammers, comparatively few of the neolithic stone objects were artificially rubbed.

Artificial rubbing does occur, rarely, upon some leaf-shaped arrow-heads; but scrapers, borers, punches, and picks, no less than triangular, and stemmed arrow-heads, were fashioned wholly by chipping. Nor is rudeness of workmanship alone any safe test of age, for some of the hammers of the Neolithic period, several examples of which exist in the collection, are scarcely more than unworked pebbles, or even less shapely stones, picked up and used; their bruised surface alone teach the purpose to which they have been applied.

It is highly probable that many of the ordinary wedge-shaped stone hatchets were intended to be used in the hand, (not mounted in any kind of haft) and that artificial rubbing had reference, in the first place, to the removal of uncomfortable angles. During the Drift period, rounded pebbles were sometimes selected by the implement-maker, with the view of securing a smooth and even butt to the tool, but this hint afforded by nature appears never to have suggested to the drift-folk the idea of artificial rubbing. Many of the neolithic unrubbed hatchets are doubtless in an unfinished state, rejected because some previously unseen flaw in the material had been discovered, or thrown away with the proverbial thriftlessness of the savage.

In many respects, however, the neolithic implements and tools show a considerable advance upon those of the earlier (Palæolithic) period. Not only are fresh methods of treating the material adopted, and new forms of implements introduced, but the neolithic people, having discovered the mode of working hard and stubborn varieties of stone, to a great extent abandoned the use of flint as a material for hatchets, and employed the more tough kinds of stone which were not so liable to chip or fracture in use. Mr. Evans has made the following remarks upon this subject :—

"Progress may not have been, and probably was not, uniform even in any one country, and indeed there are breaks in the chronology of stone implements which it is hard to fill up; but any one comparing, for instance, the exquisitely made axe-hammers and delicately chipped flint arrow-heads of the Bronze age with the rude implements of the Palæolithic period, cannot but perceive the advance that had been made in skill and adaptation of means to end. Dividing the lapse of time embraced between these two extremes into four periods, we find—

1. That in the Palæolithic (or River-gravel Drift) period, implements were fashioned by chipping only, and were not ground or polished. The material used was, moreover, as far as at present known, almost exclusively flint.
2. That in the Reindeer (or Cavern) period of central France, though grinding was not practised, yet greater skill in flaking flint and in working up flakes into serviceable tools, was exhibited. In some places, as at Laugerie, surface chipping is found on the flint arrow-heads, and recesses have been worked in other hard stones than flint, though no other stones have been used for cutting purposes.
3. That in the Neolithic (or Surface Stone) period of Western Europe, other materials beside flint were used for the manufacture of hatchets, grinding on the edge and on the surface was generally practised, and the art of working flint by pressure from the edge was probably known.
4. That in the Bronze period such stone implements as remained in use, were, as a rule, highly finished, many of the axes being perforated and of graceful form, and some of the flint arrow-heads evincing the highest degree of manual skill."[1]

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[1] "On the Manufacture of Stone Implements in Pre-historic Times," pub. in Trans. International Cong. Pre-his. Archæo., 1868, p. 193.

The processes introduced during the Neolithic period appear, therefore, to have been "grinding" and "flaking by pressure;" "drilling" in its perfection, was probably not attained until the Bronze period.

The hatchet, however, needed to be dressed into shape before it was ground or polished, and this was effected, by "flaking" when the material, like flint, possessed a conchoidal fracture; by "pecking" or "sawing" when the material used was felstone, basalt, fibrolite, greenstone, jade, &c.

FLAKING BY PERCUSSION.

The mode of flaking flint by percussion has been often described. The pre-historic flaking-hammer was probably a mere pebble, figs. 6 and 7, in some instances shallow depressions were "pecked" on the opposite flat sides of the pebble, fig. 6, in order to afford a firmer hold to the operator, sometimes these depressions were deep, and occasionally the "hammer-stone" was perforated; examples of these varieties exist in the collection, they were probably held in the manner shown by fig. 8.

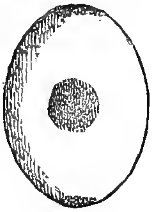
Fig. 6.

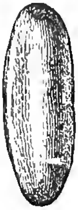
Fig. 7.

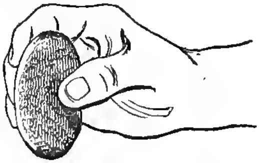
Fig. 8.

The head of the "flaking-hammer" at present used in the manufacture of gun-flints, is in form not at all unlike the earlier pebble-hammer; the modern tool is fitted to a wooden handle, but it is doubtful whether this addition is an improvement, for flaking and chipping delicate objects it probably is not. The flaking-hammer in present use by the flint-knappers at Brandon, has a heavy head of iron about 3½ lbs. in weight, with steel faces; the head gradually decreases in size from the centre to the faces, which measure no more than half an inch by one-eighth. This hammer-head only differs in form from a pebble in having flattened sides, which meet at four angles; it appears, however, that the original English gun-flint flaking hammer-head had not these angles, but was rounded like a pebble, the present form of hammer-head having been introduced from France. The force usually given to detach a flake, is equal to about twice the weight of the hammer. When about to flake, the workman rests the mass of flint on his left knee, and with one smart tap on the corner of the flint, the hammer being directed at an angle of about 45°, strikes off a flake. A flake struck off in the manner described, always exhibits a little swelling or knob (bulb of percussion) at the spot where the percussion took place, indeed the presence of such a lump on a piece of flint may be taken as evidence that it was produced by design, and the absence of it is equally good proof that the fragment was merely shattered from a block by some accidental cause. Flakes of this kind have been used by pre-historic races, and are used by modern savages without further manipulation. The Australian mounts such a flake at the end of his throwing-stick *(wamera)*, and uses it for re-pointing his spear. The natives of New Caledonia tip spears with flakes of obsidian. The Swiss lake-dwellers set flakes of flint in wood and used them as saws. Examples of these and other ancient and modern applications of "flakes" may be seen in the collection. A considerable number of flakes were, however, worked up into tools and arrow-heads.

Among the modern stone arrow-head makers, probably the most expert are the Shasta Indians of California, many examples of whose handiwork may be seen in the collection; in several instances these modern arrow-heads are still attached to the shafts, thus helping us to understand how the ancient weapon-heads were mounted.

When about to commence operations, the Shasta Indian seats himself on the floor, and laying a stone upon his knee to serve as an anvil, with one blow of his agate hammer he separates an obsidian pebble into two parts; then, giving a blow to the fractured side, he splits off a flake. Holding this against his anvil with the thumb and finger of his left hand, he commences a series of continuous blows, every one of which chips off fragments of the brittle substance. The arrow-head gradually assumes its destined shape, and is completed in rather more than an hour. One of these Indians was asked to make an arrow-head from the remains of a broken glass bottle, which, after two failures, he succeeded in doing. He gave as a reason for the failure of his first attempts, that he did not understand the grain of the glass. Arrow-head making among the Shasta Indians, as among other North American tribes, is a distinct business, in which few attain excellence.[1]

Schoolcraft says, that among the Prairie Indians, arrow-head making is the employment of particular men, generally old men who are past hunting.[2]

The Shasta Indians frequently chip the edges of the flakes they use for making arrow-heads, by means of a notch in a piece of horn, as a glazier chips glass. Nor is the power of working flint with stone tools limited to savages, for we learn that Professor Nilsson habitually made such gun-flints as he needed, when out shooting, with stones picked up as he went; he says, "I always chipped the flint myself * * *; whenever in want of a gun-flint, I first selected a large flint; I then looked out for a boulder of a suitable size, and of compact hard granite, or quartz-sandstone; with this I split the flint into flakes, more or less thin, and of course with sharp edges. Having selected one or more splinters (flakes) suitable for my purpose, I went to a large-sized granite stone, using it as a support for the splinter, which I held in my left hand, while with my right, in which I held the hammer-stone, I managed, by means of some projecting corner or blunt point of the same, to chip the edges of the splinter into a gun-flint of the desired form. Lastly, I knocked out the notch for the screw in the back of the flint. But it was of the utmost importance that, during the operation, the point of the splinter on which I was operating should rest upon the support, as otherwise the splinter would instantly break. My habit of shaping the flint in this way, by means of a piece of granite or quartz-sandstone, enabled me at once to recognise the stone hammer which the aborigines of Scandinavia made use of to chip out their flint implements. . . . . Necessity taught *me* this art, and necessity was also the teacher of the first inhabitants of Sweden."[1]

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[1] See "Reliquæ Aquitanicæ," p. 17. "Caleb. Lyon, Bull. Amer. Ethno. Soc." Dec. 1860, p. 39.

[2] "Archives of Aboriginal Knowledge," vol. iii., p. 467.

In the modern manufacture of gun-flints, the first process consists in dividing the large mass with a heavy hammer, into blocks of convenient size. The pre-historic hatchet-maker, however, avoided this operation; he generally selected a flint which did not greatly differ in form from the implement he intended to make from it; that this was so is proved by the presence of patches of the natural outer crust of the flint, which usually occur upon different parts of the finished tools. Having selected the flint, he proceeded to remove by flaking such projecting parts as would interfere with the future utility of the implement. This done, and the rough outline of the hatchet having been obtained, the operator commenced removing a series of flakes from the sides and edge; having finished one side, the implement was turned on the other, and the process was repeated, a central mid-rib was thus left which gave strength to the hatchet. Usually this operation was carried out a second time, two or three smaller flakes being removed where only one had previously been detached. This was the last stage in the manufacture of the drift implements, from thirty to thirty-five flakes appear to have been removed in making the more symmetrical examples. In detaching these flakes the hammer-stone was held in one, probably the right hand, and all the action of striking was performed by the hand merely working freely from the wrist; the arm appears not to have been moved, the elbow was probably pressed on the knee to keep the action of the wrist uniform.[2] The flint to be flaked was held in the left hand, and its position was shifted from time to time, in order to present a fresh surface to the hammer-stone; this can be seen from the direction in which the flakes have been detached, particularly in the case of oval implements, from these flakes have been removed which as it were overlapped each other.

A mode of flaking by using a punch is mentioned by some travellers. The Apachees, like most of the tribes west of, and in the Rocky Mountains, make their arrow-heads of flint or obsidian. Every tribe has its *factory*, in which, according to Catlin,[1] these arrow-heads are made, and only certain adepts carry on the work. Blocks of flint are collected, these are broken with a hammer, consisting of a horn-stone pebble, with a withe twisted round it to serve as a handle. The master workman, seats himself on the ground, and lays one of the pieces so struck off on the palm of his left hand, holding it firmly down with two or more fingers of the same hand, and with his right hand, between the thumb and two fore-fingers, places his chisel (or punch) on the point that is to be flaked; and a co-operator (a striker) sitting in front of him, with a mallet of very hard wood, strikes the chisel (or punch) on the upper end, flaking the flint off on the under side, below each projecting point that is struck. The flint is then turned and chipped in the same manner from the opposite side, and so turned and chipped until the required shape and dimensions are obtained, all the fractures being made on the palm of the hand.

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[1] Stone Age of Scandinavia, p. 7.

[2] Mr. Wyatt informs me that this is precisely the mode of working adopted by the Brandon flint-knappers.—E. T. S.

In selecting a flake for the arrow-head, a nice judgment must be used, or the attempt will fail: a flake with two opposite parallel, or nearly parallel, planes is found, and of the thickness required for the centre of the arrow-point. The first chipping reaches near to the centre of these planes, but without quite breaking it away, and each chipping is shorter and shorter, until the shape and the edge of the arrow-head are formed.

The yielding elasticity of the palm of the hand enables the chip to come off without breaking the body of the flint, which would be the case if they were broken on a hard substance. The Apachees have no metallic instruments to work with, the flaking instrument they use is made of the tooth of the sperm-whale. It is about six or seven inches in length, and one inch in diameter, with one rounded side and two plane sides; therefore presenting one acute and two obtuse angles, to suit the points to be broken.

The process of arrow-head making among the Apachees has a curious feature, both the holder and striker sing as they work, and the strokes of the mallet are given exactly in time with the music, and with a sharp and *rebounding* blow, in which, the Indians say, consists the great *medicine* (or mystery) of the operation.

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[1] "Last Rambles amongst the Indians," pp. 187—190.

What Catlin has said with reference to a *rebounding* blow is perfectly true; it is impossible to flake flint with a dull, heavy, smashing blow; it is the measured and rebounding blow—a shock rather than a blow—which, given with judgment, enables the material to take its own line of cleavage, and produces what is so well known as the conchoidal fracture.

From the known skilfulness of the gun-flint knappers, it might naturally be expected that some of the experts would be able to make close imitations of the flint tools and weapons used by the pre-historic folk: but fortuately those who have tried have not been successful. Not a single skilled workman in Brandon has ever succeeded in producing the beautiful conchoidal waves, crimpings, and ripple work displayed on the surface of some of the ancient Scandinavian flint daggers. There is a limit to the constructive skill of the modern knapper, and, happily, to the mischieviously directed ability of forging impostors: and it is a curious fact that the climax of high art in flint-work was attained at a period generally described as barbarous—then was lost as civilization advanced —and now the *modus operandi* seems irrecoverable. The fine work altogether defies imitation; even the self-sufficiency of Flint Jack quails before the exquisite specimens of antiquity, as he humbly expresses the remarkable opinion that "it is a barbarous art lost to mankind.[1]" The Turks, however, still practise the tedious process of fashioning gun-flints by surface chipping. Specimens of these Broussa gun-flints are in the collection. Surface chipping, as already mentioned, is also adopted by some modern savage races in finishing their stone arrow-heads.

PECKING.

When materials which do not possess the conchoidal fracture were made into hatchets, other processes than flaking were needed in order to bring them into shape. It is very doubtful whether chisels were used at all for cutting stone during the Neolithic period. Stone chisels were, perhaps, chiefly employed at that time for cutting wood. The process adopted for working granite and other varieties of hard stone was "pecking." The characteristic marks of this process may be detected upon many stone implements, such as pestles, mortars, hatchets, and axes. A pointed tool of some hard variety of stone was used for "pecking," it was held in a direction perpendicular to the surface to be worked, and not at an angle with it as when a chisel was the tool employed. From the number of fragments found, it is evident that many implements must have been broken under this operation. It is also clear from the numerous unfinished specimens which have been met with, that the characteristic unsustained labor of savages caused many to be abandoned with careless indifference in an unfinished state, after considerable time and labour had been bestowed upon them. In case A 42, there is an unfinished grooved axe from California, in process of manufacture; this specimen consists of a beach pebble, approaching the shape of the implement intended to be made; this pebble has been rendered symmetrical by "pecking," and a groove has been worked around it by the same process. When finished, the "pecking" marks would have been removed by friction, probably with sand and water. The large series of stone mortars from California upon case H 12, have been hollowed by "pecking." Modern stone-cutters work granite and certain varieties of sandstone by "pecking." With marble and some kinds of stone, however, it is necessary to "lift off" chips with the chisel, instead of crushing and destroying the surface by "pecking;" but, as before mentioned, this use of the chisel is probably a modern and not an ancient method of working stone. The mortice holes in the stones at Stonehenge appear to have been worked by "pecking;" marks of a pointed tool are to be seen within one of the mortice-holes of the fallen impost of the central trilithon.

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[1] I am indebted to my friend Mr. James Wyatt, F.G.S., Bedford, for an account of the gun-flint manufacture still carried on at Brandon, of which I have availed myself in the above notice.—E. T. S.

SAWING.

Many ancient hatchets of fibrolite and jade have been sawn from the mass. Mr. Evans has suggested that the saw used was "probably a flint-flake used in conjunction with sand, or in some cases used by itself."[1] Some of the modern jade hatchets, from New Zealand, in the collection have been sawn from the block. In shaping implements by "sawing," the rough mass of stone was weakened along the intended line of fracture by sawing partly through it on both sides; the ultimate severance was effected by a blow. This mode of working bone and stone appears to have been frequently adopted in pre-historic times, and by modern savages possessing but indifferent cutting tools. Indeed slate, and some varieties of paving stone are still sawn half way through and then fractured; the Yorkshire paving stone recently laid in Salisbury, has all been worked in this manner.

From the convexity of the grooves upon some of the ancient implements it is probable that a cord with sand was used for sawing. Oviedo, who visited St. Domingo in 1513, says that the inhabitants and their neighbours on the adjoining continent were able to cut iron, using only sand and a thread of *Cabuia* or *Henequen*, (two species of agave) for the purpose. They made use of the thread as we should of a saw, drawing it alternately from right to left, during which they rubbed quickly against the iron very fine sand, which they had previously spread along the passage.

Among the Swiss lake-dwellers, a block of stone was in the first place reduced to a suitable size with a hammer stone; the outline of the implement intended to be made was then marked out by grooves sawn to a depth sufficient to weaken the stone, and the projecting portions were then removed by a skilful blow with a hammer stone, after which the implement was smoothed and sharpened upon a flat grinding stone. Many of the specimens, both of stone and bone, from the lake-dwellings show marks of sawing.

Not only were other materials than flint worked by the Neolithic people by the new methods of "pecking" and "sawing," but a new mode of flaking flint appears to have been discovered and practised in finishing some of the more delicate implements.

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[1] "On the Manufacture of Stone Implements in Pre-historic Times." Trans. Inter. Cong. Pre-his. Archæol., 1868, p. 192.

FLAKING BY PRESSURE.

Some of the flint arrow-heads found in Yorkshire, and some of the flint spear-heads and daggers found in Scandinavia, exhibit such parallel flaking (ripple work) that it is difficult to believe it possible to remove flakes with such precision by blows given with a hammer-stone or other tool, and it is probable that this fine work was effected by *pressure* and not by *percussion.*

The ancient Mexicans flaked obsidian by *pressure*; they held the block of stone between their naked feet, and then with a T shaped wooden implement, the broad end of which was placed against the chest, they pressed off flakes with great rapidity and dexterity.[1]

Admiral Sir E. Belcher has described the present method of flaking chert by *pressure* as practised by the western Esquimaux, at and north of Icy Cape.[2] They select a log of wood in which a spoon-shaped cavity is cut, and place the flake to be worked over it; by pressing gently along the margin vertically, first on one side, then on the other, as one would set a saw, they splinter off alternate fragments, eventually making a spear or arrow-head with two cutting serrated sides.

The handle of the flaking implement used, is of fossil ivory or wood, and in a groove worked in this handle they insert a piece of hard bone or reindeer's antler, and secure it by a strong thong put on *wet*, which, on drying, shrinks and holds it firmly in its place. The point of the bone or horn projects beyond the handle, and is strong enough not to yield when pressed upon the flint. The Indians of California adopt the same process in making their obsidian arrow-heads. An Esquimaux "flaker," with a handle of fossil ivory and a point of bone, may be seen in the Blackmore collection. Some flint tools have been found in Yorkshire, which may have served as "flakers;" these tools are about the size and shape of one's finger, but are brought to a blunt point at one, sometimes at both ends. Mr. Evans has remarked of them that "the ends are rounded and worn away as if they had been used in fashioning other flints."

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[1] Torquemada "Monarquia Indiana," Seville, 1615, Hernandez "Rerum Med. Nov. Hisp. Thes.," Rome, 1651.

[2] "Trans. Ethnol. Soc.," New Series, vol. i., part 2, 1861, p. 138.

He has found by experiment that with such tools he was able to chip out arrow-heads closely resembling ancient examples; but a much more efficient tool was one made of stag's horn, some of the arrow-heads chipped out with which show "surface-flaking." He has confessed, however, that he was unaware of the method by which the long regular flaking on the surface of Danish spear-heads and daggers, and the minute ornamentation on the handles of the latter were produced.[1]

GRINDING.

During the Stone age, the use of revolving grindstones was unknown; the surface grinding of stone hatchets as well as the grinding of the edge, was effected upon flat stones, as the mason grinds his chisel, or the carpenter his plane-iron. A number of ancient grindstones have been found; a remarkable example popularly known as "Carreg-y-Saelhan," (the stone of the arrows) existed in the middle of a path about three miles above Aber, on the northern shore of Caernarvonshire, in a pass among the mountains. It was a flat block of stone about six feet in length, the upper surface of which was scored in places with short grooves about a quarter or half an inch in depth. According to tradition, on the commencement of war, the warriors were accustomed to sharpen their arrows and other weapons upon this stone.[2] Sometimes the grindstone was merely an exposed mass of living rock. Mr. John Moncton Brown, of Queensland, says that the stone by the sides of the creeks in parts of Queensland, when of a suitable quality, is perfectly hollowed in places where the aboriginies have sharpened their stone tools.

The Scandinavian grinding-stones are oblong, polygonal, thin in the middle from use, and thicker at the ends, in form resembling a thick thigh-bone; they are usually from ten to fifteen inches in length; the ground surfaces, which run lengthwise, are plane, concave, or convex, according to the class of tools which have been sharpened upon them. Many flint and stone hatchets in the collection show a number of planes upon their surface arising from this mode of grinding. Several ancient grinding-stones may be seen in the collection. The modern savage has no more idea of the use of a revolving grindstone, than had the pre-historic races. Wallis says that the natives of Otaheite, when working a plank with hatchets "made of a tough, greenish kind of stone," found that their tools presently lost their edge, every man, therefore, had by him a cocoa-nut shell filled with water, and a *flat* stone, with which he sharpened his adze almost every minute.[1]

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[1] "On the manufacture of stone implements in pre-historic times," in the "Trans. Inter. Cong. Prehis. Archcol.," 1868, pp. 191—193.

[2] "Archæol. Journ.," no. 82, 1864, p. 170.

DRILLING.

In drilling holes in axes or hammers, the hole was probably produced by rotatory friction, and the use of sand and water. The pre-historic tool-maker commenced boring from the two opposite faces of the implement, and if he succeeded in making the holes meet nearly opposite to each other, he would polish and work them into a fairly cylindrical opening; if he was unsuccessful the stone was thrown away, or a second hole commenced.[2]

That drilling has been effected in recent times without tools of metal is proved by the experience of travellers. Mr. Wallace speaks of cylinders of rock crystal, four to eight inches long, and one inch in diameter, which are still made and perforated by very low tribes on the Rio Negro. These are formed merely by rubbing, and the perforatión is effected by twirling a flexible leaf-shoot of wild plantain between the hands against the stone, and thus with sand and water boring through it. This is said to take years to effect. Such cylinders as the chiefs wear are stated to take two men's lives to perforate. The stone is brought from a great distance up the river, and is very highly valued.[3]

Cook mentions the drilling even of glass, by the natives of New Zealand, with flakes of stone: "We had given the people at Tolaga a piece of glass, and in a short time they found means to drill a hole through it, in order to hang it round the neck, as an ornament, by a thread; and we imagine the tool must have been a piece of this jasper.[1]

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[1] Cook's "Voyages," vol. i., chap. viii., p. 267.

[2] Franks, in "Horæ Ferales," p. 139.

[3] Wallace, p. 278.

Professor Nilsson has pointed out that many of the perforations in stone axes have not been artificially produced. "We sometimes observe, among collections of antiquities, flint axes with haft-holes; but if we observe them more carefully, we shall find that some of these perforations have not been made by the hand of man, but are natural holes in the flint. The savage did not drill the hole, but sometimes chipped the edge of it more or less, so as to be enabled to use it as a haft hole."[2]

A Wiltshire example of a stone axe with a natural perforation is preserved in the Hoare collection, at Stourhead; it was found in a tumulus, No. 158, near Amesbury (Normanton Group); a tumulus figured by Stukeley, and called by him *Bush Barrow*. This axe is egg-shaped, and is made from a fossil sponge. When placed in the tumulus it was attached to a wooden handle, which was encircled by a kind of bronze ferrule, part of this bronze ring still remains attached to the axe.[3]

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[1] Cook's "First Voyage," vol. iii., chap. 10, p. 60.

[2] "Stone Age of Scandinavia," p. 78.

[3] This axe is engraved in Sir Richard Colt Hoare's "Ancient Wiltshire," vol. i., plate xxvii., fig. 3. The other objects found associated with it are of sufficient interest to merit special notice. Traces were observed of what was considered to have been a wooden shield, rather more than twelve inches in diameter, ornamented with thin plates of bronze fastened with bronze rivets. A bronze wedge-shaped celt was found near the shoulder-bones of the skeleton, and traces existed of its wooden handle. Near the bones of the right arm were a bronze spear-head, and a bronze dagger, with the remains of the original wooden handle of the latter. This handle was studded with thousands of minute gold pins, driven in so as to form a chevron pattern. It is figured in the "Anc. Wiltshire," vol. i., plate xxvii., fig. 2. The sheath of this dagger appears to have been ornamented with a rectangular plate of gold, neatly ornamented. Resting upon the breast of the skeleton was a thin lozenge-shaped piece of wood, measuring six and seven inches across its two diameters, this was covered with a thin plate of gold which overlapped the edges of the wood. This "gorget" was pierced at the upper and the lower points, evidently in order that it might be sewn upon some garment, in contra-distinction to its being worn suspended around the neck. It is figured in "Anc. Wilts," vol. i., plate xxvi., fig. 2. A smaller lozenge-shaped gold ornament, and some bone rings were also found in this tumulus. See "Anc. Wilts," vol. i., pp. 202—205. The mode of ornamenting objects by driving in small pins of metal is not limited to pre-historic races. In Case D 4, upon tablet 2, in the Blackmore Museum are two ivory armlets, the pattern on which is formed by driving in numerous minute silver pins; such armlets are in present use in west Africa.

Nilsson has suggested the form of the tool with which drilling was effected by pre-historic races :—

"Though we have only been able to guess hitherto how the savage bored the haft-hole in his axes, yet we seem near the truth, as we are even able to call experience to our help. During a visit to Orö pilot-station, on the coast in the province of Ostro-Gotha, I saw a fisherman engaged in drilling holes through flat slate boulders, in order to use them as plummets for his fishing-line. He worked his gimlet, or auger, with a drill-bow (*spärrborr*), the gimlet itself was of iron, not pointed, as one would suppose, but with a rough edge, and like a small chisel or screwdriver. The hole made in the stone with it was not rough at the bottom, but scooped out, just such as is found in those stone implements where the bored hole is more or less deeply indented from the surface, or like the indentations on hammer-stones, to place the fingers upon during use. I conclude from this that the savage used a similar gimlet or drill, and that his flint gimlet had the same form as that of the Orö fisherman—namely, that of a small chisel."[1]

The processes adopted in drilling stone probably corresponded with some of the modes employed by savages in obtaining fire. The use of the hand fire-drill by the aborigines of Australia, furnishes a description of the simplest form of drill for procuring fire, or for perforating stone or other substances :—

"To produce it (fire) they take two pieces of dry soft wood ; one is a stick about eight or nine inches long, the other piece is flat : the first stick they shape into an obtuse point at one end, and, pressing it upon the other turn it nimbly by holding it between both their hands, as we do a chocolate mill, often shifting their hands up, and then moving them down upon it, to increase the pressure as much as possible. By this method they get fire in two minutes."[2]

"To wind a cord or thong round the drill, so as, by pulling the two ends alternately, to make it revolve very rapidly, is a great improvement on mere hand-twirling. As Kuhn has pointed out, this contrivance was in use for boring in remote times.

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[1] "Stone Age of Scandinavia," p. 79.

[2] Cook's "First Voyages," vol. iii., p. 234 ; Angas, "S. Australia," pl. 27.

Odysseus describes it in telling how he and his companions put out the eye of the Cyclops:—

"They then, seizing the sharp-cut stake of the wood of the olive,
Thrust it into his eye, the while I, standing above them,
Bored it into the hole: as a shipwright boreth a timber,
Guiding the drill that his men below drive backward and forward,
Pulling the ends of the thong while the point runs round without ceasing."[1]

Sir E. Belcher describes a mode of drilling holes which is practised by the Esquimaux: "The thong . . . . . being passed twice round the drill (which is pointed with a piece of jade) the upper end is steadied by a mouthpiece of wood, having a piece of the same stone imbedded, with a countersunk cavity. This held firmly between the teeth steadies the tool. Any workman would be astonished at the performance of this tool on ivory; but having once tried it myself, I found the jar or vibration on the jaws, head, and brain quite enough to prevent my repeating it."[2]

"Lastly, there is a kind of cord-drill used by the New Zealanders in boring holes through hard greenstone, &c., in which the spindle itself is weighted. It is described as a sharp wooden stick, ten inches long, to the centre of which two stones are attached, so as to exert pressure and perform the office of a fly-wheel. The requisite rotatory motion is given to the stick by two strings pulled alternately.[3]

M. Alphonse Baux has expressed the opinion[4] that archæologists are wrong in assigning all drilled stone axes to the Bronze period.

M. Gabriel de Mortillet agrees with M. Baux that some drilled stone axes belong to the Stone period. He thinks that three methods of drilling stone axes have been adopted. In one mode a flint-flake was the tool used; with it a circle (or the nearest approach to a true circle which the workman could make) was described upon the intended axe, and this was deepened by degrees, leaving a central cylinder or core, which being at last detached, the perforation was completed.[1] This mode of drilling, or rather of carving ont, a hole belongs to the Stone period, as does also the second method, which was effected by revolving a tool in the manner of a fire-drill, either by hand or with a cord upon the object to be perforated.[2] The third process, viz., by making the hole with a hollow circular tool, belongs to the Bronze period.[3]

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[1] Quoted by Tylor, "Early History of Mankind," p. 240. Kuhn, "Herabkunft des Feuers," p. 39. Hom. Od., ix., p. 382.

[2] Belcher, "Tr. Eth. Soc.," 1861, p. 140.

[3] Thompson, "New Zealand," vol. i., p. 203.

[4] Letter written from Marseilles, 15th Feb., 1868.

M. Baux agrees with M. G. de Mortillet that drilling, in some cases, was effected with a flint-flake. He also admits the use of the ordinary drill by the Swiss lake-dwellers, and he instances four halves of serpentine axes, which he saw taken from the station of Auvernier, Lake of Neuchâtel, two of which were unfinished, and had been broken in the process of drilling when nearly completed. The circular striations within the hole proved the use of a revolving tool, whilst from the nature of the work, it was clear that a hollow drill had not been employed. From the same station (Auvernier) M. Baux, however, obtained a stone core, such as would have resulted from the use of a hollow drill. The tool appears to have been very inefficient, and to have slipped during the work. Professor Desor mentions that stone cores resulting from the use of a hollow drill are not uncommon.[4]

Several unfinished stone axes with the central cores still attached, were in the "Clément Collection" at the Paris Exhibition, 1867.

A stone axe partially drilled from both sides, found at Sipplingen, Uberlinger See has been figured.[5] A hollow drill was used in this instance, for the core still remains attached at the bottom of the perforation on each side of the implement.

A similar specimen, found at Concise, has been figured.[6]

M. Franck de Truget[7] imagines that he has met with one form of tool employed by the pre-historic folk for drilling stone axes. He obtained it from the Lake of Neuchâtel. It is a piece of sand-stone 6 cent. long, and 2½ cent. broad at the base; and is stated to be much worn from use.[1]

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[1] "Matériaux pour l'Histoire de l'Homme," vol. iii., p. 264.

[2] "Matériaux" *l.c.*, vol. iii., p. 294.

[3] "Materiaux," *l.c.*, vol. iii., p. 307.

[4] "Les Palafites," p. 19.

[5] Lee's Translation of Keller's "Lake Dwellings," plate xxviii., fig. 2.

[6] Troyon, "Habitations Lacustres," plate viii, fig. 4.

[7] Letter written from Treytel, 22nd May, 1868.

The tool used for drilling appears sometimes to have had a central projection, almost like that of a modern centre-bit, as may be seen in the perforation of a stone axe, found at Allensbach, Untersee.[2]

The occurrence of stone axes with an oval and not a circular perforation, however, perhaps shows that the boring was not effected, entirely, with a revolving tool. But Mr. J. E. Lee, is of opinion that when an oval haft-hole had to be made, two circular holes were drilled, and the intermediate piece was afterwards sawn out; a method still adopted by carpenters.

Dr. Lindenschmit considers that the last and most difficult process in the manufacture of stone axes was the drilling, and that the implements were shaped before this operation was commenced. In one plate of his valuable work he has given a series of figures to illustrate the process of drilling stone axes. Two examples show no trace of drilling; they are merely blocked into shape.[3] All the other specimens show various stages in the process,[4] and one specimen is completed,[5] Dr. Lindenschmit remarks that the boring appears in some cases to have been performed in the simplest but most tedious manner, by turning a hard stone or a very hard piece of wood, with sand and water, working from both sides towards the centre in the manner already described. He adds, that with many drilled implements the openings widen so much from the middle towards both sides, that the holes could not have been intended for hafting, whilst the number of specimens having this kind of drilled hole is too great to favour the supposition that they are in an unfinished state. It is probable that such specimens as those cited and figured by Lindenschmit[6] were held between the finger and thumb at the drilled part. This has already been noticed with reference to hammer stones and the three specimens figured by Lindenschmit are of this type.[1]

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[1] "Matériaux," *l.c.*, vol. iv., p. 293.

[2] Keller, *l.c.*, plate xxv., fig. 1.

[3] Lindenschmit, "Die Alterthümer unserer heidnischen Vorzeit," heft viii., taf. 1, n. 1, 2.

[4] Lindenschmit, *l.c.*, heft viii., taf 1, n. 3—6, 8—12.

[5] Lindenschmit, *l.c.*, heft viii., taf 1, n. 7.

[6] Lindenschmit, *l.c.*, heft viii., taf 1, n. 4, 5, 6.

He also figures three unfinished stone axes, all in process of being drilled with a hollow tool; one was found in Rhenish Bavaria, and is now in the Mayence Museum.[2] Another, broken across a former haft hole, has a second drilled hole commenced above the fracture; it was found in Lüneburg, and is now in the Hanover Museum.[3] The third was found in the lake-settlement of Wàngen, and is now in the Prince's Museum at Sigmaringen;[4] this last-mentioned specimen was probably fractured during the process of drilling.

Dr. Lindenschmit has alluded to the hollow bronze object, formerly in the collection of Dr. Klemm at Dresden, and supposed to have been used for drilling stone axes; this implement has recently been acquired by Mr. Franks, together with the Klemm collection of stone implements, and is now in the Christy Museum. It is open to doubt whether this bronze "borer" has been used for the purpose suggested.

Several drilled stone axes, found in Germany, are in the Christy collection; one specimen shows a number of planes upon its surface, caused by its having been rubbed into shape upon a flat grindstone.

In the same collection there is a partly drilled stone hammer, found at Kalinowiz; in drilling this a hollow tool has been used, for the core still remains attached at the base of the hole.

Mr. Charles Rau, of New York, has expressed the opinion[5] that two different methods, or, at least, two differently shaped drills were employed in making the haft-holes of ancient stone axes and hatchets. Some of the perforations are of equal width throughout, the surface of the hole is smooth and shining, and exhibits at intervals circular striæ or furrows, which have the appearance of a succession of parallel rings. These perforations, Mr. Rau thinks, have been drilled with a hollow cylinder, perhaps with a bronze tube. In other specimens the haft-holes are more or less smooth, but are destitute of the annular striæ, and are sometimes narrower in the middle. These holes evidently were drilled from both sides of the implement, and the drill was not a hollow cylinder, but a solid body, probably only a stick. It is hardly necessary to add that without the use of water and sharp sand, drilling either with a bronze tube, or with a stick, would have been impossible; the sand is, of course, the chief agent in the process. Mr. Rau has, as was once said of Mr. Pengelly, of Torquay, "shown the perseverance of a savage," by perforating a piece of diorite with a stick and sand only. The piece of diorite was one inch and three-eighths thick; it was so hard that a well-tempered knife produced no scratch on its surface, but merely left a metallic streak. Mr. Rau at first used emery, but he found ordinary sand quite as effectual. He complained greatly of the tediousness of the drilling process; he never could endure to work at it for more than two hours in succession. Ultimately it took him two years before he pierced the stone. He found by measurement that two hours of constant drilling added not more than the thickness of an ordinary lead-pencil line to the depth of the hole. The shortening of the drilling stick was considerable, and it became necessary to replace it several times. The first stick used was of tough ash-wood; the others, which were of pine-wood, proved to be quite as efficient. The deeper the drill penetrated into the stone, the more difficult the work became, which induced Mr. Rau, after having drilled through half the thickness of the stone, to begin another bore from the oppposite side. In due time the two holes met in the middle.

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[1] N. 4 was found at Ahlden (Lüneburg). N. 5 is without locality; both are now in the Hanover Museum. N. 6. was found at Gendrigen, province of Geldern; it is now in the Leyden Museum.

[2] Lindenschmit, *l.c.*, heft viii, taf. 1, n. 10.

[3] Lindenschmit, *l.c.*, heft viii., taf 1, n. 11.

[4] Lindenschmit, *l.c.*, heft viii., taf. 1, n. 12.

[5] "Drilling in stone without metal," "Report Smithsonian Institution," Washington, 1868.

Mr. John Evans exhibited, at the Pre-historic Congress, at Norwich, in 1868, an ancient stone hatchet from Switzerland, through which he had bored a hole with a piece of elder and sand.

NEOLITHIC IMPLEMENTS FOUND IN ENGLAND.

Cases A 19 to A 21, B 17 to B 22, C 13 to C 15, D 11 to D 13, and H 6.

Implements are shown in these cases from the neighbourhood of Salisbury and other parts of Wiltshire, as well as from Hampshire, Dorsetshire, and more distant counties. The series from Yorkshire is extensive, and contains some very interesting specimens. Mr. Evans has enumerated the usual forms of neolithic implements,[1] hatchets, grindstones, hammers, some varieties of perforated axes, chisels, gouges, spear and arrow-heads, scrapers, borers, punches and picks, as well as simple knives or flakes, and the cores from which they were struck. The figures 1 to 11, in part 1, show the typical forms of these objects.

One of the best unrubbed hatchets in the collection is a specimen found at Bishopston, by Mr. F. Sidford; the most symmetrical and highly finished of the rubbed examples is that found by Mr. Adlam at North Sway, near Lymington, Hants. But between these two extremes there is every gradation in finish; commencing with the mere removal of angles, as shown in the two specimens from Burwell Fen, Cambridgeshire. Let it not, however, be supposed that this indicates necessarily any difference in relative antiquity; it is quite probable that they are mere stages of manufacture. For instance, the three flint hatchets in the collection, found at Alderbury near Salisbury, were all obtained in digging a hole for a post; they were almost touching each other, and were probably the property of one owner; yet the first is wholly formed by chipping; another has the surfaces rubbed, but the edge remains unground, and neither it nor the chipped hatchet appear to have been used; the third hatchet has seen much service, and has evidently been reduced in length from frequent regrinding; the edge is still as keen as if it had been but recently sharpened. It is probable that such hatchets as these were frequently used in the hand unmounted.

Some wedge-shaped stone hatchets, however, were intended for hafting; the specimen found in the river Lambourn, Berks, and presented to the collection by Mr. J. Ellis Jervoise, is an example;

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[1] Ante, part 1, pp. 9, 11—18.

it is only rubbed towards the ends, the central part being left unpolished, perhaps to save trouble as it would be hidden by the binding with which it was to be fastened to its handle; but more probably this part was left rough to diminish the liability of the binding to shift and slip.

Upon a greenstone hatchet in the collection from France, this unrubbed band exists in a very remarkable manner.

By far the rarest object in the English Neolithic series, is a semilunar flint tool, found at Kempston near Bedford, by Mr. James Wyatt, by whom it was presented to the collection. This implement is probably unique; it somewhat resembles the semi-lunar flint tools found in the north of Europe, and chiefly differs from the Danish and Swedish examples in being relatively broader and shorter. It was formed like them by very skilful chipping; but the edges of the Kempston implement have been ground, which is not the case with any of the Scandinavian semi-lunar flints that have come under the notice of the writer. Nearly every trace of grinding on the *straight* edge of the Kempston tool has been worn away through use.

Mr. Evans has alluded to these crescent-shaped implements, which, he says, "appear to have been inserted in a wooden handle, inasmuch as round the circular part there are often polished markings, showing how far the handle went. The edges (straight sides) are generally much polished, showing evident signs of use. Whether they were used as saws, or for hackling and preparing flax and hemp, or for other purposes is an undetermined question."[1] It is probable, as suggested by Professor Steenstrup, that these semilunar flint tools were used by pre-historic curriers, who rendered skins supple by pulling them backwards and forwards over these implements, which were to them what the "stake" is to the modern currier. In Iceland, skins to be dressed were pulled to and fro over a ram's horn serrated on the concave edge, and slung by its two ends from the arm of a tree.[2]

Some of the Indians of North America work skins soft by drawing them backwards and forwards over the rounded end of a piece of timber fixed in the ground.[1] The Dacotahs draw skins to and fro over a cord, as large as the finger, for some time, as hard as they can pull, which renders the leather soft and supple.[2]

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[1] Ante, part 1. p. 15.

[2] E. Olafsen "Reise ig Island," 1778, pl. xx, p. 339.

The late M. Morlot agreed with Professor Steenstrup that the semi-lunar implements were used for the purpose suggested, an opinion which is confirmed by a minute examination of the surfaces of the implements themselves.

M. Morlot's remarks are as follows :—

"Mais en examinant ces pièces de très près, l'on remarque sur les deux côtés de ce tranchant en scie un fin poli d'un genre particulier, comme un vernis, produit évidemment par le frottement contre un corps trop tendre pour entamer le silex de façon à en effacer les aspéritiés sensibles de la surface, frottement qui a dû s'exercer transversalement à la direction du tranchant. Cela conduit le professeur Steenstrup à considérer les demi-lunes comme ayant servi à préparer et assouplir des lanières de peau. Dans ce but elles auraient été assujetties par leur tranchant convexe dans un support en bois fixe et ayant le tranchant droit tourné en haut."[3]

The straight sides of many of the Scandinavian semi-lunar flints are polished from the friction of some soft substance; such friction as would arise from pulling the skin of an animal backwards and forwards over the edge; this polishing does not extend over the whole surface of the implement, but only to about three fourths of an inch from the straight edge; the curved part of the flint, if inserted in a block of wood, would have been protected from friction.

Among the Wiltshire neolithic specimens is a very large and nicely chipped flint arrow-head, of the stemmed and barbed type, and a broad, flat, thin, flint blade of a rather uncommon form; both of which were found at Pick Rudge Farm, near Overton, Wilts, in grubbing up an ash tree. In the series shown from the Yorkshire Wolds and tumuli are examples of flint scrapers,[4] borers, punches, picks, saws (?), and arrow-heads. There are also pointed and straight-edged wedges; and sea-side pebbles which have served as hammers, and have been roughened artificially in the middle on both sides, to give a firmer hold to the operator.[1] Many of the objects at present classed as "scrapers," may not have been used in preparing skins; some specimens, however, show wear and polishing at the edge, of the particular nature to be expected from prolonged friction against a soft substance, such as a skin. Mr. Evans possesses a flint scraper, found at Bridlington, Yorkshire, which has been so much used that the marks of chipping, at the edge, are almost obliterated. There can be no doubt that some flint scrapers were intended to be mounted in a handle, more or less resembling the example figured at page 125. Many specimens in the collection show that the part to be inserted in the handle has had the angles dressed off, and has been made to taper with this object. There is a Danish flint scraper in the Nash Mills Collection, which is very illustrative of this intention; it was found by Mr. John Evans in a peat-moss, near Veddelöv. The central ridge has been completely removed by a series of blows, as far as, and no farther than, the scraper would have been inserted in the handle.

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[1] John D. Hunter, "Indian Tribes," Philadelphia, 1823, p. 295.

[2] Schoolcraft "Archives of Aboriginal Knowledge," vol. iv., pp. 60, 61.

[3] "L'Archéologie du Mecklenbourg," p. 27.

[4] Ante, part 2, p. 125, figs. 1—5.

Some of the so-called flint saws from Yorkshire are perhaps only flakes which may have been used for scraping bone in the manufacture of pins, &c. Many of the leaf-shaped flint arrow-heads from Yorkshire are delicately chipped; but the "parallel flaking" which occurs upon some triangular arrow-heads affords the most remarkable instance of the skill in working flint which was attained by the dwellers upon the Yorkshire Wolds. Superior "parallel flaking" may be seen upon certain Scandinavian flint knives, these, however, must be regarded as examples of the highest skill to which the ancient flint-knappers ever attained. This "parallel flaking" defies imitation, and we are wholly in ignorance as to the way in which it was effected. Probably it was *not* effected by *percussion*; the minuteness of the flakes removed, their absolute parallelism, and the smallness of the "bulb," all tend to strengthen this opinion. There is still another characteristic of "parallel flaking" which militates against the idea that it could have been accomplished by *percussion*, and this is the circumstance that frequently each flake has been removed in such a manner as to leave a curved surface to the blade in process of formation; the flake detached from one side of the blade has ascended to the strengthening mid-rib of the weapon and has then descended at a similar angle to the edge on the opposite side of the blade; and this has been accomplished, in the case of some Scandinavian flint knives, not once or twice, but perhaps twenty times or more in succession, and, as before mentioned, with absolute parallelism. It is highly probable that "parallel flaking" was effected by *pressure*, in a manner analogous to the mode adopted by the modern Esquimaux, or the ancient Aztecs.[1] This opinion is strengthened by the discovery in Yorkshire of "finger-shaped" flint tools brought to a blunt point at one or both ends, and which are perhaps the implemements by which this pressure-flaking was accomplished. Several of these tools may be seen in the collection; they show wear *only* at the blunt points, and the traces of wear agree very closely with those which exist upon the bone implements still in use by the Esquimaux for flaking flint by pressure.

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[1] Ante, part 2, p. 130, figs. 6—8.

The drift-folk were probably unacquainted with the art of flaking by *pressure*, and no instance of "parallel flaking" has been observed upon palæolithic implements; but the art of removing a flake so as to leave a curved surface to the implement was practised by the people of the Drift period.

The interesting objects found in some ancient pit-dwellings near Salisbury are deserving of more than a passing notice, but, as a more detailed account of these pits and of the specimens obtained from them will be published in a future number of the "Wiltshire Magazine," it may be sufficient at present to allude only to some of the more remarkable objects in the series.

The presence in the pits of a large number of calcined flint nodules of a convenient size for grasping in the hand, has led to the supposition that the pit-dwellers practised "stone-boiling;" that is, they cooked their food by heating stones and casting them into the water, possibly because their pottery was not sufficiently well made to stand the direct heat of the fire. A North American tribe, the "Assinnaboins," (Stone-boilers) are said by Catlin to have obtained their name from the circumstance that they cooked their food in this particular manner. The process has been thus described:— "A hole is dug in the ground about the size of a common pot, a piece of the raw hide of some animal is put over the hole, is pressed down with the hands close around the sides, and filled with water. The meat to be boiled is then put in this water; and in a fire, kindled close by, several large stones are made red hot; these are successively dipped and held in the water until the meat is boiled; from which singular and peculiar custom the Ojibwas have given this tribe the appellation of Assinnaboins, or stone-boilers."[1] It is not uninteresting to note that after the Assinnaboins had been supplied with pots by the traders, they practised their old mode of cooking at public festivals. This retention of ancient practices for ceremonial purposes, for some time after they had been superseded by more recent inventions for all ordinary purposes, is analogous to the use of flint knives by the Egyptian embalmers,[2] by the Jews in the rite of circumcision,[3] and by the Arabians in the ceremonial of making pledges of faith,[4] long after metal had been in common use among these people for other than ceremonial observances.[5]

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[1] Ante, p. 138.

The Assinnaboins, however, are not the only "stone-boilers" in America; the Mikmaks and the Souriquois also boil in this way,[6] as well as most of the tribes inhabiting the north-west coast;[7] indeed these last widen their canoes by "stone boiling:" the canoes are "dug out" of the solid trunk of a tree, and need to be widened towards the middle to give them breadth and sufficiency of beam. When the "dug-out" is hollowed and shaped, it is filled with water; red-hot stones are plunged into this, until it reaches the boiling point; sticks are then forced in between the sides, and the canoe is allowed to cool; this process is repeated again and again until the desired expansion is attained.[1]

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[1] Catlin "North American Indians," vol. i., p. 54.

[2] Diod. Sic. ii., p. 62.

[3] Exodus iv., 25, Joshua, v., 2, xxiv., 30. See Ante, part i., p. 14.

[4] Herodotus, iii., § 8.

[5] E. T. Stevens, "Flint Chips," 1870, Bell & Daldy, pp. 110—112.

[6] Schoolcraft, "Archives of Aboriginal Knowledge," vol. i., p. 81.

[7] Mayne, "Brit. Columbia," p. 279. Sproat, "Scenes and Studies of Savage Life," pp. 54—161.

Mr. Albert Way, has given a modern instance of the practice of stone-boiling, which was communicated to him by the late M. Morlot. "In Carinthia they make a dark brown beer, called Steinbier, by throwing hot stones into the vat or cask; a fact that recalls the account given by Linnæus of Finnish beer, called 'Lura,' prepared by throwing red-hot stones into the liquor, instead of boiling it."[2]

Grain-rubbers have been found in the Salisbury pit-dwellings; one of these is a mere hollowed stone, another is of the "saddle-shaped" form, and a third is the upper stone of a true quern.

The "saddle-quern" is a slab of stone, the upper surface of which becomes hollowed towards the middle, from use in grinding. The grain was probably parched, and then reduced to a coarse powder by a "runner" of stone worked by hand.

Sir S. Baker notices the present use of this simple form of hand-mill. "I must," says he, "have swallowed a good-sized millstone since I have been in Africa, in the shape of grit rubbed from the *moortraka*, or grinding-stone. The *moortraka*, when new, is a large flat stone weighing about 40 lbs. Upon this the corn is ground, by being rubbed with a cylindrical stone with both hands. After a few months' use half of the grinding-stone disappears, and the grit being mixed with the flour, the grinding-stone is actually eaten."[3]

The next advance in the form of the hand-mill, is, when it consists of two circular discs of stone, the upper being made to rotate upon the lower by means of a wooden handle inserted in the top stone. This form of quern was "fed" with grain through an aperture in the centre of the upper stone, the meal passing out between the margins of the stones. The upper stone was frequently concave, and the lower convex, to prevent sliding off, and also to give a fall to the meal. In the case of the modern querns from Teneriffe in the collection, however, the stones are flat.

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[1] Lord, "Naturalist in Brit. Columbia," vol. ii., p. 256. Sproat, *l.c.*, p. 87.

[2] Archæologia Cambrensis," vol. xiv., third series, p. 413.

[3] "The Albert Nyanza," vol. i., p. 65.

No "pot-querns" were found in the pits. The "pot-quern" is a distinct advance upon the ordinary quern; it consists of a hollowed stone basin, with a smaller stone fitting into it. The smaller stone was made to revolve, and the meal escaped through a hole made at the side of the outer stone.

According to the primitive mode of working the hand-mill, two women seated themselves on the ground and placed the mill between them; with one hand they turned the top stone by means of the handle, either held by both together, or passed from one to the other; with the other hand they poured the grain into the eye or hopper. In the East Indies and some other countries, the hand-mill is still worked in this manner. The quern was, probably, frequently worked by a single individual.

Among the bone objects found in the pit-dwellings, are polishing tools, borers, gouges, spear-heads, and combs, as well as a bone needle with a drilled eye, and a bone ring.

The bone combs closely resemble specimens found in various parts of England and Scotland.[1] An example has also been met with in Kent's Cavern, Torquay, above the stalagmite; and another, now preserved in the British Museum, was found a few years since in some pits, upon Danebury Hill, near Stockbridge. These implements were, probably, not used as combs for the hair, nor even, perhaps, for "heckling" flax or other fibre. The Esquimaux employ a tool very like these "combs," the long handle of which is of wood, and the short thick teeth consist of the claws of birds firmly lashed to the wood with sinew-thread. These modern tools are used for scraping fat, &c. from the back of skins, preparatory to preparing them for clothing.

Several of the bones (metacarpal and metarsal) of horse and ox, found in the pits, are much polished towards the middle, as if they had been grasped at each end, and then had been rubbed backwards and forwards over a soft substance, such as leather. Shoemakers use a bone tool of this kind for polishing the soles of shoes; the use of this tool, however, is gradually passing away, and an iron tool with a wooden handle at each end is taking its place. This iron polisher is heated when used. Examples of shoemakers' bone and iron polishers may be seen in the collection; as well as some bone tools used for closing "welts," which might be easily mistaken for chisels; it is possible that some of the ancient bone chisels (so-called) have been used for closing the seams of leather work, rather than for cutting purposes. For polishing "uppers," shoemakers employ a wooden implement, in form very like the bone tools used for polishing soles.

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[1] "Archæol. Journl.," vol. x., p. 212. Wilson, "Pre-historic Annals of Scotland," vol. ii., p. 106.

The bone needle from the pits, is an interesting specimen; it is not so delicately made as those found in the caves of Dordogne and the Pyrenees, examples of which may be seen in the collection, but it is superior in workmanship to the bone needles still, or recently, in use among the Esquimaux.[1]

It may be objected that it would be extremely difficult to sew leather with a bone needle. But, possibly, the passage of the needle may have been rendered more easy by subjecting the leather to some previous treatment, such as that adopted by the Esquimaux:—"who soften the seal-skins of which their boots, shoes, and mittens are made; the women chew them an hour or two together, and the young girls are often seen employed in thus preparing the materials for their mothers."[2]

In the series of terra-cotta objects from the pits, are spindle-whorls, pellets for slinging, and fragments of pots and vessels of simple forms.

The use of spindles for twisting thread has been observed in Asia, Africa, and North and South America, as well as in Europe.

With the ancients the spindle was a stick, ten or twelve inches in length, having at the top a slit, or catch (*dens*), in which the thread was fixed, so that the weight of the spindle might continually carry down the thread as it was formed. Its lower extremity was inserted into a small wheel, called the whorl (*vorticellum*), made of stone, terra-cotta, wood, or metal, the use of which was to keep the spindle more steady, and to promote its rotation.[1]

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[1] Parry, "Second Voyage for the Discovery of a North-west Passage," 1824, p. 537, fig. 11. "Reliquiæ Aquitanicæ," p. 130, fig. 50.

[2] Parry, *l.c.*

The ancient Mexican spindle had a whorl attached to it, to increase its momentum—the end of the spindle with the Aztecs revolved in a hole made in a piece of stone or metal. Throughout Central America, the spindle, at the present day, is made to revolve in a bowl.[2] The spindle in use by the Pueblo Indians of New Mexico is in the form of a boy's top, with the addition of a stem fifteen or eighteen inches long; this spindle is entirely of wood, and when used is placed in an earthen bowl, which gives a smooth surface for the lower point of the spindle to turn upon.[3] Spindles with whorls of wood or gypsum were used by the ancient Egyptians.[4] Within the last few years an old woman was seen in the isle of Islay spinning flax with a spindle which was merely a stick with a potato stuck on the end of it to serve as a fly-wheel.[5] Spindles with whorls of stone are still used in parts of France and Italy.

However, had no "spindle-whorls" been found in the pits, this would not have afforded conclusive evidence that spun fibre was unknown to the pit-folk, for fibres are twisted into thread by the New Zealanders and other savages, by rolling the substance to be spun with the hand upon the thigh. The Laps appear to have prepared sinew thread in this manner. Linnæus tells us, that "The women make their thread of the sinews in the legs of the reindeer, separating them while fresh with their teeth into slender strings, which they twist together."[6] In another passage it is said that "The tendons in the legs of the reindeer serve to make thread or cord. In each hind leg are two tendons, one before the other; in each fore leg, one behind and two or three before it. The Laplanders lay hold of with their mouth, split, and moisten them, rubbing them from time to time with reindeer marrow, preserved in bladders for that use, in order to render them as supple as possible. Each string is made sharp at both ends, and drawn through holes of various sizes in an instrument made on purpose (of wood or metal), to render it as fine and smooth as they can. Two such threads are then twisted together by means of the hand upon the thigh or knee. They are generally held with the left hand, and twisted with the right upon the left knee, proceeding downwards, the thread being moistened from time to time with saliva."[1]

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[1] Smith, "Dict. Greek and Roman Antiq.," article "Fusus."

[2] Schoolcraft, "Archives of Aboriginal Knowledge," vol. iv., p. 443.

[3] Schoolcraft, *l.c.* vol. iv., p. 436, pl. 37, figs. 4, 5, and 6. E. G. Squier, "Archæology of Nicaragua," in "Trans. American Ethnol. Soc.," vol. iii., p. 87.

[4] Wilkinson's "Manners and Customs of the Ancient Egyptians," vol. iii., p. 136.

[5] Tylor, "Early History of Mankind," p. 189.

[6] "Lachesis Lapponica, or a Tour in Lapland," translated by C. Troillius, London, 1811, vol. i., p. 133. "Reliquiæ Aquitanicæ," p. 131.

This, probably the lowest form of the art of spinning fibres, either animal or vegetable, by rolling them between the hands or on the thigh, is an art practised by savages in several parts of the world, and especially remarkable in tribes at the level of the civilization of the South-sea Islanders. Next above this, there is a process which seems to indicate the manner in which the invention of the spindle took place. The substance to be spun having been wound on a stick to serve as a reel, it struck the savage artisan that, by rolling or trundling this stick on his thigh, he could twist his thread much more easily than by the hand alone. The rude South American Payaguas are observed to use this process, and the natives of Australia have hit on the same device.[2]

The terra-cotta pellets found in the pits are of the form of the leaden *glandes* of the ancients, and like them they were probably used for throwing with the *ribbon-sling.*

The natives of New Caledonia use artificially formed sling-stones of the same shape, many examples of which are in the collection. The circular discs of flint, usually classed as sling-stones,[3] several specimens of which may be seen in the collection, were probably used with the *stick-sling.*

Nilsson has thus described the *ribbon-sling* :—

"The *ribbon-sling* consists of a string or strap, of the breadth of about one or two inches, and about three feet long. One end is twisted round the fore-finger of the right hand, the other is held between that finger and the thumb; the sling-stone is placed in the loop formed by the ribbon, and the sling is then swung round the head until the stone has obtained a sufficiently swift motion, when one end of the ribbon is let go, and the stone flies forward with immense speed through the air. Those who have long practised the use of this weapon are able to take a good aim with it. We see by this that sling-stones must be smooth, and, in preference, *oval.*"[1]

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[1] "Lachesis Lapponica," *l.c.*, vol. ii., p. 25.

[2] Tylor, "Condition of Pre-Hist. Races, &c.," in Trans. Inter. Congr. Pre-hist. Archæol," 1868, pp. 16, 17.

[3] Ante, part. i., p. 16.

The *stick-sling* was "a yard or better in length, and about an inch in diameter; it was split at the top, so as to make an opening wide enough to receive the stone, which was confined by the re-action of the stick on both sides, but not strong enough to resist the impulse of the slinger. It required much practice to handle this instrument with any great degree of certainty, for if the stone, in the act of throwing, quitted the sling either sooner or later than it ought to do, the desired effect was sure to fail. Those who could use it properly cast stones to a considerable distance, and with much precision."[2]

The *stick-sling* sometimes had a *hole* in the end, instead of a *slit.* "Such a sling is sketched in Lepsius's great work upon Egypt, where a man is represented, at whose feet lies a heap of small stones, and who holds in his hand a *stick-sling* of this description, which he appears to be using very actively in the fight."[3]

Another form of sling, apparently hitherto undescribed, combines the advantages of the *ribbon-sling* with those of the *stick-sling.* It consists of a stick with a string or strap attached at one end. The sling-stone is placed under this string, and between it and the stick at the point where they are attached to each other. The loose end of the string and the butt-end of the stick are grasped in the hand; the string, being pulled down tightly, retains the sling-stone in its proper position. Stones can be thrown with this form of sling with far greater precision than with either the *ribbon-sling* or the *stick-*

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[1] "Stone Age of Scandinavia," p. 50.

[2] Strutt "Sports and Pastimes," p. 74.

[3] "Nilsson, *l.c.* pp. 49, 50.

sling, and the great objection to the *stick-sling*, the difficulty in regulating the precise moment at which the stone shall quit the slit, is obviated, for the moment the string is released the stone speeds to the mark.[1] In practice it has been found that a piece of pottery of a circular shape presents the best form for throwing with the combined *stick and ribbon sling* just described. The object to be be thrown must be thin, nearly of equal thickness throughout. The ancient flint and obsidian discs are well suited, in point of form, for use with this kind of sling.[2]

Pieces of chalk cut into the shape of *glandes* were also found in the pits; these were probably intended for use with the sling.

Some of the objects usually classed as sling-stones may, however, have been propelled by means of a pellet-bow; an object which perhaps connects the invention of the bow with the development of the sling. The pellet-bow is provided with two strings instead of one, these are kept at the distance of about three inches from each other by means of a piece of bamboo of that length, one end of which is tied to one string and the other to the second string. Towards the middle a band of plaited cotton fibre, about two inches in length and an inch in width, connects the two strings. This band serves as a rest for the pellet, which is discharged from the bow in the usual manner, only, for the protection of the left hand, it is necessary to discharge the pellet somewhat to the right of the bow. Mr. Tylor says of this weapon:—"The pellet-bow, which is a bow string with a broad strap, or with a double string and net, and has been found in use for shooting clay pellets and stones at small game, and even as a weapon in war, is a modification of the bow, it is used in South America but perhaps not elsewhere."[3]

The pellet-bow however, is in very general use in the East Indies, and the example in the Blackmore Museum was obtained from that country. In the Punjab, the pellet-bow is called *ghŭlail*, and the pellet used with it *ghŭlaila*; it is probable that the latter obtained its name from the sound (*ghul*, a noise) it would make in passing rapidly through the air in its flight, and that the bow received its name from the pellet. The bow used for shooting arrows is called *kămān*. Pellets for use with the *ghŭlail* are made of clay, sun-dried, and of a spherical form, not of the shape of the glandes.

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[1] I am indebted to my colleague, Dr. Blackmore, for a description of this kind of sling; he has frequently used it in his younger days; indeed, it was the form of sling generally used by himself and his schoolfellows.—E.T.S.

[2] "Flint Chips," pp. 302—304.

[3] "Early Hist. of Mankind," p. 177. Dobrizhoffer, vol. ii., p. 360. Klemm, C.G., vol. ii., p. 17. Southey, vol. ii., p. 369, vol. iii., p. 863.

Some oblong lumps of chalk, drilled at one end were met with in the pits; these have probably served as loom-weights for giving tension to the warp-threads in weaving. Some of them show wear at the sides of the drilled hole, apparently from the friction of a cord by which they were suspended. Other examples of similar objects made of burnt clay, from the Swiss lake-dwellings, are shown; as well as a portion of another specimen found near Shrewton, Wilts. A loom from Denmark, in which the warp threads were strained by having stone weights attached to them, was shown in the Paris Exhibition, 1867.[1]

A chalk "loom-weight," similar to those obtained from the Salisbury pit-dwellings, and found with fourteen others like it, about the year 1855, on the hill above Kingston Deverell, near Warminster, may be seen in the collection; it was presented by the Rev. D. M. Clerk. The fifteen specimens were placed in regular order, forming about three parts of a circle, around a heap of greasy black earth. An iron implement[2] is stated to have been found associated with these loom-weights. The loom-weights were all lying in a slanting direction (not upright), with the small ends inwards, declining at a considerable angle, and with the holes, without exception, "up and down."

Two iron objects were found in the Salisbury pit-dwellings, and some of the flints have been flaked with iron tools. The whole of the pottery from the pits is hand-made; it has not been turned on the wheel.

NEOLITHIC IMPLEMENTS FOUND IN IRELAND.

Cases A 22 to A 27, B 23 to B 25.

The series of stone implements from Ireland includes a large number of hatchets, chisels, hammers, "net-sinkers," "spindle-whorls," and arrow and spear-heads. Flint proper, or flint obtained from the chalk, as distinguished from oolitic chert, is only found in a few localities in Ireland, chiefly in the counties of Antrim, Down, and Derry; consequently implements made of this material are for the most part obtained from the province of Ulster.[1] One particularly fine specimen of a flint hatchet, found in Ireland, is included in the collection. Stone hatchets from Ireland are not usually very highly finished.

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[1] See also Worsaae's "Nordiske Oldsager," p. 159, fig. 558.

[2] I am unable to ascertain the form of this implement.—E.T.S.

The series of stone hammers is large and interesting.[2] Some of these are mere pebbles, with a shallow depression worked on each surface; in other examples these depressions are considerably deepened, and in some instances the hammer-stone is completely perforated; probably, however, this had no reference to any mode of hafting, for which the sloping sides of the perforations are unfitted. There seems to be little doubt that hammers of the pebble form were for use in the hand, unmounted, and that they were held at the depression, or hole, between the thumb and the first finger, as shown by fig. 8.[3] These hammers would have been good tools for flaking flint; the blows appear to have been given with the pointed end. Fig. 9 is another form of hammer-stone, also intended for use in the hand; the ends of this implement are broad and wide, quite unlike those of the pebble-hammers last mentioned.

In some hammer-stones more than two depressions exist; thus in the Christy Collection there is a stone-pounder, or hammer-stone, from the Andaman Islands, with a *series* of depressions for the fingers and thumb. An ancient hatchet with similar depressions was recently found in a subterranean chamber at La Tourelle, near Quimper, in Brittany.[4]

Nilsson, in his work upon the "Stone Age of Scandinavia," gives figures of hammer-stones, which show most of the varieties of these tools.[1] One of these specimens (fig. 5) has six indentations upon its surface; it was found in Sweden. Fig. 4, likewise found in Sweden, has several indentations. Worsaae figures similar objects;[2] as also does Lindenschmit.[3]

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[1] Wilde, "Cat. Mus. Roy. Irish Acad," p. 6.

[2] See a notice of hammer-stones by Mr. Evans, ante, part 1, pp. 12, 13.

[3] Ante, p. 130.

[4] M. R. F. le Men., p. 11, "Archæologia Cambrensis," vol xiv., third series.

Another variety of hammer is shown by fig. 10; this kind, unlike the others already described, was undoubtedly intended to be hafted, probably by twisting a withe around it at the grooved part.

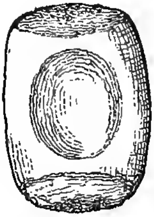

Fig. 9.

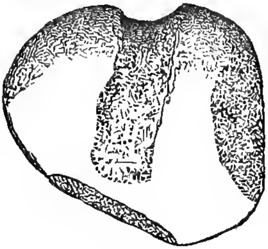

Fig. 10.

Some country blacksmiths and plate-layers on railroads, haft their iron hammers in a similar manner, examples of which may be seen in the collection.

Many drilled stones however are shown, which were, probably, not used as hammers. Some of these have been regarded as weights for nets, and it seems that the fishermen of Heligoland and Rügen still use for "net-sinkers" stones having natural perforations. But many instances of the modern use of circular stones with drilled holes may be cited to show the necessity for caution in classing *all* the ancient specimens as "net-sinkers." In the Christy Collection are some perforated stone discs, five inches and a half in diameter, used for crushing or grinding grasshoppers, spiders, &c., by the Bechuanas of South Africa, who regard these insects as forming a valuable article of food. When digging wild roots, this stone is placed upon the digging-stick to give it greater weight. A specimen of such a digging-stick, with the stone attached, is preserved in the Museum of the Missionary Society, London.

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[1] Plate i., figs. 1—7, 9, 11, 12, 13, and 14; pp. 10—16.

[2] "Nordiske Oldsager," plate xii, figs. 32—34.

[3] "Alterthümer Unserer Heidnischen Vorzeit," heft viii, taf. 1., figs. 4 and 6.

Similar drilled stones are used for arming clubs by certain savages, and two examples, each fixed to the end of a stick, from San Cristoval, Salomon Islands, are preserved in the Christy Museum; a third specimen from the same locality, is in the collection of Mr. R. Day, jun., Cork. In the Christy Museum there are also some hammers with perforated stone heads, used in Iceland for breaking up salt fish.

The use of drilled stone-discs, by certain tribes of North American Indians, in playing a game has led some archæolgists to imagine that these "net-sinkers" may have been applied to a similar purpose.

Some of the smaller perforated stone discs are usually classed as "spindle-whorls,"[1] and perhaps some of these objects may have been applied to this purpose, those of *oval* form, however, could not have served as fly-wheels. Oval "spindle-whorls" with *two* perforations, have been found on the sites of some of the Swiss lake-dwellings.[2]

A very interesting "spindle-whorl" is preserved in the Taunton Museum; it was found in one of the pits upon Worle Hill, near Weston-super-Mare, in 1852, by the late Rev. F. Warre. This object is made from the ball of the femur of an ox; the natural depression in the middle of the bone, appears to have caused the maker to drill the hole towards one side; indeed the hole slopes so much, that the "whorl" would have been useless as a fly-wheel.

Probably many so-called "spindle-whorls" have been used as buttons, perhaps for fastening dresses of skins, for which their size and strength would have rendered them very suitable.

The whetstones[3] exhibited from Ireland probably do not belong to the Stone age proper. Sir William Wilde remarks upon similar examples, "the antique specimens are usually found in connection with metal objects;"[4] and whetstones, of the types shown from

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[1] Ante, p. 156. See an article on "Ancient Spindles," by H. Syer Cuming, in "Journ. Brit. Arcæol. Association," vol. xv. pp. 306—310.

[2] Lee's translation of Dr. Keller's "Lake Dwellings," p. 173. Troyon "Habitations Lacustres," pl. viii., fig. 8.

[3] Ante, part 1, p. 12.

[4] "Cat. Mus. Roy. Irish Acad.," p. 87.

Ireland, have been found, at Nydam, in South Jutland, associated with Roman coins belonging to the three first centuries of the Christian era.[1]

In America, no less than in Europe, whetstones of similar forms appear to have been found with objects of the metallic period. A copper wedge-shaped celt and two bronze chisels were found associated with human remains and a whetstone, very like the Irish examples, in a cave near the village of San José, on the banks of the river Maypu, Chili.

In Greenland such whetstones are said to be still used by the women for sharpening their bone needles.[2] Whetstones which have been employed for this purpose would, probably, exhibit a series of grooves upon the surface resulting from the grinding; and, indeed, whetstones bearing straight and rather deep grooves, such as would have been produced in grinding bone needles, were found in some of the French caves. One example, a sandstone block having upon its surface a series of such grooves, has been figured;[3] it was obtained from the cave of Massat (Ariége), where M. Alfred Fontan and M. Garrigou found bone needles of the delicate and highly finished type shown in the collection from the Dordogne caves. The cave-folk, like the Greenland women, appear to have re-ground their bone needles when the point was broken;[4] in some instances the fresh point has been made by means of simple longitudinal cuts,[5] the workman not having taken the trouble to grind away the tool marks; perhaps, however, these needles are in an unfinished state.

A nice series of Irish stone arrow-heads is shown; these are classed according to their form, as triangular,[1] stemmed,[2] or leaf-shaped.[3] Specimens of flint-tipped arrows, in use by the Esquimaux and the Pimo Indians of Arizona, are exhibited to illustrate the modes of attaching stone arrow-heads to shafts.

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[1] Engelhardt, "Denmark in the Early Iron Age," plate xvi., fig. 19, p. 66.

[2] Thomsen, quoted in Nilsson's "Stone Age of Scandinavia," *note*, p. 20.

[3] "Reliquiæ Aquitanicæ," p. 133, fig. 51.

[4] Some of the bone-needles found in the French Caves have been broken at the eye and a second hole has been drilled, or commenced, below the first, in order to re-fit the needle for use. See "Reliquiæ Aquitanicæ," p. 135, figs. 53 and 54.

[5] "Reliquiæ Aquitanicæ," B., plate xvii, figs. 17—20. The needles (figs. 18 and 20) show unobliterated marks of cutting in re-pointing.

Mr. Evans has mentioned that stone arrow-heads are "frequently set in silver and worn by the Scotch and Irish peasants as charms against sprites and witchcraft. They are called elf-bolts, and are supposed to fall from the clouds."[4]

When cattle pined away, or suffered from some disease, which passed the peasants' skill to discover, it was believed that the animals had been stricken by these elf-bolts,[5]

> "There ev'ry herd by sad experience knows,
> How, wing'd with fate, their elf-shot arrows fly,
> When the sick ewe her summer food foregoes,
> Or stretch'd on earth the heart-smit heifers lie."[6]

When such a contingency arose, the doctor felt the animal over, and did not fail to find one or more "elf-darts" in its skin. These were placed in the water which was given to the creature to drink, and the cure was of course speedily effected. Allan Ramsay, in his poems,[7] explains "elf-shot" thus:—"Bewitched, shot by fairies. Country people tell odd tales of this distemper amongst cows. When elf-shot, the cow falls down suddenly dead; no part of the skin is pierced, but often a little triangular flat stone is found near the beast, as they report, which is called the elf's arrow."

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[1] Sir William Wilde's *two* first classes of arrow-heads are included in this group, the "triangular," and the "triangular hollowed out at the base." See "Cat. Mus. Roy. Irish Acad., pp. 19, 20. It appears nearly impossible to separate the two classes, they pass into each other.

[2] For the reason already mentioned, Wilde's "barbed" and "stemmed" arrow-heads are included in this group. See "C. M. R. I. A.," pp. 20—22.

[3] "Leaf-shaped" and "lozenge-shaped" arrow-heads are included in this group. See "C. M. R. I. A.," pp. 22—27.

[4] Ante, part 1, p. 15.

[5] For information on this subject, see Brand, "Popular Antiquities," vol. ii., pp. 489—491. Sinclair, "Statistical Account of Scotland," i., p. 73; iii., p. 56; x., p. 15; xxi., p. 148. Vallancey's "Collectanea de Rebus Hibernicis," no. xiii., description of plate ii.

[6] Collins, "Ode on the Popular Superstitions of the Highlands of Scotland," p. 10.

[7] Published in 1721, p. 224.

In a letter written by Dr. Hickes to Pepys, dated London, June 19th, 1700, is the following allusion to elf-arrows:—"At the same time, as I remember, he (Lord Tarbut) entertained the duke (Duke of Lauderdale) with a story of Elf-arrows, which was very surprising to me. They are of a triangular form, somewhat like the beard or pile of our old English arrows of war, almost as thin as one of our old groats, made of flints or pebbles, or such-like stones, and these the country people in Scotland believe that Evil Spirits (which they call Elves, from the old Danish word *Alfar*, which signifies *Dæmon, Genius, Satyrus,*) do shoot into the hearts of cattle; and, as I remember, my Lord Tarbut, or some other Lord, did produce one of these Elf-arrows, which one of his tenants or neighbours took out of the heart of one of his cattle that died of an unusual death. I have another strange tale, but very well attested, of an Elf-arrow that was shot at a venerable Irish Bishop by an Evil Spirit, in a terrible noise louder than thunder, which shaked the house where the Bishop was; but this I reserve for his son to tell you, who is one of the deprived Irish Clergymen, and very well known, as by other excellent pieces, so by his late book, entitled '*The Snake in the Grass.*' I mention this to encourage you to desire my Lord to send you a more perfect account of these Elf-arrows."[1]

In Norway, certain diseases known as *Alfskot*, (in Denmark *Elveskud*) that is "elf-shot," show the prevalence of this superstition. Even in distant Japan, flint and obsidian arrow-heads are regarded as the weapons in use by spirits. The popular belief being that every year an army of spirits fly through the air with rain and storm; when the sky clears the people go out and hunt in the sand for the stone arrow-heads the spirits have dropped.

It is stated that, in A.D. 839, in the land of Dewa, after a long-continued storm which lasted a week, the whole ground of the shore was covered with stones, although there had been none visible before. Some of these were arrow-heads, others lance-heads; and they were white, black, green, or red. Similar showers of arrow-heads are recorded to have taken place in the same land of Dewa, on two occasions, in the year 885. It need hardly be added that these phenomena are to be accounted for by the heavy rains washing away the particles of earth or sand, and so bringing to light the arrow-heads before unnoticed.[1]

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[1] "Memoirs of Samuel Pepys, Esq.," edited by Lord Braybrooke. London: Colburn, 1825, vol. ii., p. 187.

Flint arrow-heads were regarded as most potent spells against the influence of witchcraft and the evil eye; and a foe, even when protected by magical power, was not proof against the wound received from a flint arrow-head. Orvar Odd slew Gyda with flint-tipped arrows, although she had previously stopped the iron-tipped arrows he had shot at her with the palm of her hand, upon which they made no more impression than upon a stone.[2]

In parts of Italy the peasants collect stone arrow-heads, and wear them as charms against injury from lightning.[3]

Dr. Foresi was led to the discovery of the occurrence of stone arrow-heads in the island of Elba, by noticing that these objects were frequently hung round the children's necks as amulets, and Signor Bosis has noticed the prevalence of a similar custom near Ancona.

SCOTLAND.

Case A 27.

A few flint arrow-heads, stone "spindle-whorls," and a fine drilled stone axe are shown from Scotland.

In Scotland stone axes were popularly known as "purgatory hammers." They were frequently found associated with human remains, and the simple discoverers imagined that they were placed with the corpse of the former owner in order that he might thunder away at the gates of purgatory until he was released.[4]

WALES.

Case D 15.

In this case a cast of drilled stone hammer, the surface covered with an incised pattern in diamonds, is exhibited. The original, which is believed to be unique, was presented by the Rev. E. L. Barnwell, to the Society of Antiquaries of Scotland, and is preserved in their collection. It was found, about 1840, in stubbing up a wood at Maysmote, near Corwen, Merioneth. The chert of which it is made is so hard that a steel knife leaves no scratch upon its polished surface.[1]

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[1] A. W. Franks, "Notes on the discovery of Stone Implements in Japan," in "Trans. Inter. Congr. Prehist. Archæol.," 1868, pp. 260, 261.

[2] "Forn-Aldar Sögur Nordlanda," Copenhagen, 1829. Nilsson, "Stone Age of Scandinavia," pp. 197—199.

[3] Sig. Nicolucci has mentioned the prevalence of this custom near Naples.

[4] Wilson, "Pre-Historic Annals of Scotland," p. 135.

NEOLITHIC IMPLEMENTS FOUND IN FRANCE.

Cases A 28 to A 30, and D 15 to D 18.

Many of the French hatchets shown are of greenstone and very highly finished. A nicely chipped lance-head of flint, ten inches in length, is also included in the series.

The objects found in the dolmens of France are represented by a series of casts of some of the most remarkable specimens in the very fine collection of the Societé Polymathique du Morbihan, at Vannes. Among these are fac-similes of hatchets of greenstone, jade, serpentine, and fibrolite, from Mont St. Michel, Carnac; Manné-er-H'rock, Locmariaker; Tumiac (Arzon), and Bougon (Deux Sèvres). Casts of beads and ornaments of a beautiful material, to which M. Damour has given the name of *callaïs*, are also shown. This stone is not unlike torquoise, but it is of an apple-green colour, the translucence of the original material, unfortunately, cannot be imparted to the casts. It is not now known from whence this variety of precious stone was obtained.

A series of the large nucleï (cores) found near Pressigny le Grand (Indre-et-Loire) is shown; these objects are popularly known as "*livres-de-beurre*" from their form. It is now generally believed that the region around Pressigny was the site of an ancient and extensive manufactory of flint implements, which appear to have formed an object of barter or traffic, for implements made from the peculiar flint of Pressigny occur at distant places. Examples have been found in the dolmens of Central France; two are in the Musée d'Artillerie, Paris, obtained from the bed of the Seine; others are in the Museum of Poitiers; in the collections of the Abbés Bourgeois and Delaunay, and elsewhere.

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[1] "Archæol. Camb.," p. 307, 1860. "Archæol. Journal," vol. xix, p. 92.

The nucleï from Pressigny have had a number of lateral chips removed. This was done in order to govern the form of the long flakes, to be subsequently struck off, and which were intended for daggers, lance-heads, &c.[1]

An attempt has been made to show that these large cores at Pressigny are the waste of a manufactory of gun-flints. The miquelet gun-lock was first introduced in 1630, but it is doubtful whether flint or iron pyrites was used; if flint, it was used without having been subjected to any manufacturing process. In 1703, however, a complete change had taken place in fire-arms. The soldier was armed with a musket, but it was his duty to find his own flints; and it was not until 1719 that gun-flints were regularly manufactured in France. Extreme care has always been taken in that country to select only localities where the flint is well adapted for the purpose, and lists of these selected localities are preserved in the Archives of the Depôt Central de l'Artillerie. Pressigny is not named among them; the Pressigny flint is not adapted for making gun-flints, and none of the small waste chips, so abundant upon the site of a gun-flint manufactory, have been found at Pressigny.

The Marquis de Vibraye sent a series of stone hatchets found at Pressigny to the Paris Exhibition (1867). These specimens illustrated the progress of manufacture from the rude block to the finished implement; all the specimens presented some defect, showing that they were neither serviceable implements accidentally lost, nor tools which had been thrown away after having been broken in use, but specimens which had been rejected in the process of manufacture. M. Mortillet remarked at the time that the supporters of the gun-flint theory, if any remained, would do well to shut their eyes in passing this case.[2]

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[1] Evans "On the Worked Flints of Pressigny le Grand," "Archæologia," 1867. Steenstrup & Lubbock, "Trans. Ethnol. Soc.," new series, vol. v., pp. 221-227.

[2] "Promenades Préhistoriques à l'Exposition Universelle," p. 34.

THE ANCIENT LAKE-HABITATIONS OF SWITZERLAND.

The collection of objects exhibited from the lake-villages *(pfahlbauten)* of Switzerland is large and interesting. It was formed, for Mr. Blackmore, by Admiral the Honourable E. A. J. Harris, C.B. —then H.M. Minister at Berne, who obtained in so doing the valuable assistance of Dr. Keller, Dr. Uhlmann, the late M. Troyon, and other eminent Swiss archæologists. Professor Rütemeyer has also enriched the collection by adding a fine series of animal remains illustrative of the fauna of the pfahlbauten; unfortunately these specimens cannot be exhibited from want of space.

Mr. Evans has alluded to the lake-dwellings as being "the most instructive of all places where stone implements are found."[1] Had time allowed, he would, doubtless, have entered more minutely into a consideration of lake-dwellings, their general plan and mode of construction, and the light which is thrown upon the habits of the people by the relics found upon the sites of ancient lake-villages in Switzerland and other countries. The following summary will be found to comprise a general account of these very interesting vestiges of pre-historic man.

So early as the year 1829, piles and other antiquities were discovered in deepening the harbour in front of Ober Meilen, on the Lake Zurich; but the matter was not then followed up. The earth dug out, and all contained in it, was taken in boats and sunk in the deeper parts of the lake.

The dry winter of 1853-54 reduced the level of the Swiss lakes lower than had ever been previously known. The water mark of 1674 upon the stone of Stäfa was the lowest recorded, but in 1853-54 the water-level was one foot below this mark: consequently, in some places a broad strand was left uncovered along the margin of the lakes, while shallow banks in them were converted into islands. Taking advantage of this circumstance, the inhabitants of Ober Meilen reclaimed a piece of land, which they enclosed with walls and raised the level of the included space with mud dredged from the lake. In dredging this mud, numbers of piles, stags' horns, implements, and other objects were found.

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[1] Ante, part 1, p. 18,

M. Aeppli of Meilen was the first person to draw attention to these objects. Subsequently Dr. Keller conducted further researches at Meilen which he followed up by similar investigations in other lakes.[1] The result has established the fact that the early inhabitants of Switzerland constructed some, at least, of their dwellings above the surface of the water; in these they probably lived in a similar manner to the Pæonians, whose habits have been described by Herodotus.[2]

Some of these Pæonians, a Thracian tribe, lived in huts supported upon piles driven into the bed of the lake Prasias in Pæonia (part of modern Roumelia), as we learn from the following passage:—

"They, on the other hand, who dwelt about Mount Pangæus and in the country of the Doberes, the Agrianians, and the Odomantians, and they likewise who inhabited lake Prasias, were not conquered by Megabazus.[3] He sought indeed to subdue the dwellers upon the lake, but could not effect his purpose. Their manner of living is the following: platforms supported upon tall piles stand in the middle of the lake, which are approached from the land by a single narrow bridge. At the first the piles which bear up the platforms were fixed in their places by the whole body of the citizens; but since that time the custom which has prevailed about fixing them is this: they are brought from a hill called Orbelus, and every man drives in three for each wife that he marries. Now the men have all many wives apiece, and this is the way in which they live. Each has his own hut, wherein he dwells upon one of the platforms; and each has also a trap-door, giving access to the lake beneath; and their wont is to tie their baby children by the foot with a string to save them from rolling into the water. They feed their horses and their other beasts upon fish, which abound in the lake to such a degree that a man has only to open his trap-door and to let down a basket by a rope into the water, and then to wait a very short time, when up he draws it quite full of them."

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[1] Keller, "The Lake-dwellings of Switzerland," translated by J. E. Lee, pp. 10, 11; "Pre-historic Times," p. 119.

[2] B. v. § 16.

[3] The date of the expedition of Megabazus is B.C. 513.

But for the recent death of M. Morlot, we might perhaps ere this have tested the truth of the account given by Herodotus of the Pæonian lake-dwellers by commenting on actual specimens of their huts, their weapons, and their fishing implements. With the aid of Sir John Lubbock and others, M. Morlot was in the midst of arranging an expedition into Roumelia to dredge in Lake Prasias, when he died. It is to be hoped that some properly qualified traveller may yet be found to carry out an undertaking so unhappily interrupted.[1]

Many savage and semi-savage tribes live in pile-dwellings at the present day. The fishermen of Lake Prasias still inhabit wooden cottages built over the water as in the time of Herodotus. The city of Tcherkask is built over the Don. The city of Borneo is altogether built upon piles; and similar constructions have been described by various travellers in New Guinea, Celebes, Solo, Ceram, Mindanao, the Caroline Islands, and elsewhere.[2] Dumont D'Urville thus describes the city of Dorei in New Guinea:—[3]

"The inhabitants are distributed in four villages at the edge of the water. Each village contains from eight to fifteen houses built on piles; but each house is composed of a row of distinct cells or cabins, separated by a passage which runs from end to end. These buildings are entirely made of wood, very roughly worked; they show the light through in all directions, and often shake when anyone walks over the floor."

The fishermen's huts which still existed in the river Lammat at the end of the last century were of a similar nature.[4]

The Bishop of Labuan thus describes the dwellings of the Dyaks:—"They are built along the river-side, on an elevated platform twenty or thirty feet high, in a long row; or rather it is a whole village in one row of some hundreds of feet long. The platforms are first framed with beams, and then crossed with laths about two inches wide and two inches apart, and in this way are well ventilated; and nothing remains on the floors, but all refuse falls through and goes below."[1]

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[1] "Quarterly Review," No. 250, October, 1868, p. 420.

[2] "Pre-historic Times," pp. 122, 123.

[3] "Histoire," vol. iv., p. 607.

[4] Keller, *l.c.*, p. 318.

"Captain Burton mentions a visit to an African tribe, the Iso, who, during some forgotten war, fled from Dahome, and established themselves in a lagoon marked in our charts as the Denham Waters."[2]

"The Dahomean King is sworn never to lead his army where canoes may be requiried; these Iso, therefore, have built their huts upon tall poles, about a mile distant from the shore. Their villages at once suggest the Prasian lake-dwellings of Herodotus, and the crannoges of Ireland and the Swiss waters. The people are essentially boatmen; they avoid dry land as much as possible, and though said to be ferocious, they are civil enough to strangers. In June, 1863, I moored my little canoe under one of their huts, and I well remember the grotesque sensation of hearing children, dogs, pigs, and poultry actively engaged aloft."[3]

In the Paris Exhibition (1867) models of pile dwellings used by the aborigines of the extreme north of America were exhibited.[4]

It has been stated that the natives living near Lake Maracaybo, in South America, erect pile-dwellings over the lake to which they resort, in order to escape from the mosquitos which infest the shore.[5]

Lord also mentions that the Indians of the Suman prairie, British Columbia, on the subsidence of the annual flood, in May and June, build pile-dwellings over a lake there; to these they retire to escape from the mosquitos which at that period infest the prairie in dense clouds, but will not cross the water. These stages are reached from the canoes by a ladder made of twisted cedar-bark.[6]

Antiquities resembling those found upon the sites of the Swiss lake-settlements occur at certain places on the *mainland,* as at Ebersberg, near Berg, on the Irchel; Burg, near Vilters; Uetliberg, and Windisch. The place first-named is of especial interest, it was examined, excavated, and reported on by G. von Escher von Berg, first in 1851, and subsequently in 1862. It appears to be a settlement on the mainland agreeing with the lake village of Nidau-Steinberg, both as to the civilization of its inhabitants and the period of its existence; in common with some of the lake-settlements it appears to have been founded in the Stone period, and continued to be inhabited up to and during the Bronze period, but was abandoned before iron came into common use. The stone hatchets, flint knives, stone corn-crushers, tools of horn and bone, as well as the implements and ornaments of bronze, are perfectly identical with the antiquities of the lake-dwellings.[1]

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[1] "Trans. Ethnol. Soc.," new series, vol. ii., p. 28.

[2] "Quarterly Review," No. 250, October, 1868, p. 419.

[3] "Memoirs Anthropological Soc. of London," vol. i., p. 311.

[4] "Matériaux," *l.c.*, vol. iii., p. 363.

[5] "Quarterly Review," No. 250, October, 1868, p. 429.

[6] "Naturalist in Brit. Columbia," vol. i., pp. 313, 321.

Remains of pile-dwellings have also been discovered by M. Luigi Pigorini upon the *mainland,* in a spot where no lake has existed, at Castellazzo (Fontanellato), in the province of Parma; indeed, both varieties of pile-dwellings, those constructed over the water and those built upon dry land, appear to have been in use in Italy as well as in Switzerland. Pile-dwellings upon dry land are still erected by the natives in parts of Cochin China, Cambodia, and Siam.[2]

Remains of ancient lake-villages, supported upon piles, have been observed in Bavaria, Mecklenburg, Pomerania, and Illyria.[3]

STRUCTURE OF LAKE-DWELLINGS.

SUBSTRUCTURE.

1.—*Pile-dwellings.*—What may especially be called pile-dwellings are by far the most numerous variety of lake-habitation in Switzerland and Upper Italy. The ideal restoration in Case D 21, made under the direction of Dr. Keller, will give a general idea of the construction of this form of lake-dwelling. Piles of various kinds of wood, sometimes split, but in general mere stems with the bark on, sharpened sometimes with the aid of fire, sometimes with stone-hatchets, and in later times with tools of bronze and probably of iron, were driven into the shallows of the lakes, provided they were not rocky, at various distances from the shore. These piles were placed sometimes close together, sometimes in pairs, sometimes tolerably wide apart, generally in regular order, but occasionally in apparent confusion. In every instance the heads of the piles were brought to a level, and then the platform beams were laid upon them, which in some cases were fastened by wooden pins, in others mortises or central hollows were cut in the heads of the vertical piles to receive the cross beams. Occasionally cross timbers were joined to the upright piles below the platform to support and steady the structure, either forced in as it were between them or fastened to them by what workmen call "notching," that is, portions were cut out of the vertical piles to receive the cross timbers. The platform resting on the top of this series of piles appears in many cases to have been of the rudest construction, and to have consisted merely of one or two layers of unbarked stems lying parallel one to another; in a few cases, as in one of the Italian lake-villages, it was composed of boards, split out of the trunks of trees, and joined with some approach to accuracy.

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[1] Keller, *l.c.*, pp. 364—377.

[2] "Matériaux pour l'Histoire de l'Homme," vol. ii., p. 24.

[3] E. T. Stevens, "Flint Chips," pp. 127, 128.

In many instances the outer row of piles appears to have been closed in by a kind of wattle or hurdle-work, made of small twigs or branches, probably intended to lessen the splash of the water, or to prevent the piles from being injured by floating wood.

The distances of these lake-villages from the shore, varied considerably; there appears to have been no regular rule in this respect; it may, however, be well to mention that when a lake-settlement has been inhabited both in the Stone and in the Bronze period, that part referable to the Bronze period is usually further from the shore and deeper in the lake than that which belongs to the age of Stone. With this exception, as far as can be ascertained, nearly the same mode of construction prevailed in erecting pile-dwellings during the Stone, Bronze, and Iron periods.

Some few of the lake-settlements appear to have almost touched the shore, but this is exceptional: most of them are at some little distance from it, and in all probability they were connected with it by a narrow platform or bridge supported by piles; in some instances the remains of such bridges have been discovered.

In certain cases, as near Nidau, the pile-dwellings have another peculiarity: they are formed on artificial elevations at the bottom of the lake, which consist of stones, probably brought in boats and sunk on the spot; in fact, one boat, still loaded with the stones which proved too great a cargo for it, and which consequently sunk it to the bottom, is still to be seen at Peter's Island in the Lake of Bienne. This mode of construction (Stein-berg) is not uncommon, especially in the western lakes.

It is impossible, according to the opinions of the engineers, to drive piles into a heap of stones, consequently the piles must first have been driven more or less deeply into the mud, and the stones must then have been thrown down between and around them, in order to consolidate the structure.

2. *Fascine-dwellings.*—Some lake-dwellings were not supported on piles, but rested upon layers of sticks, or small stems of trees, built up from the bottom of the lake, till the structure reached above the watermark, and on this the platform for the huts was placed. Numerous upright piles are found in dwellings of this description; they were not used however to support the platform as in the pile-dwellings proper, but served as stays to the great mass of sticks, which reached down to the bottom of the lake. Fascine-dwellings occur chiefly in the smaller lakes, and apparently belong to the Stone period.

3. *Crannoges, or "Wooden-islands."*—These singular structures bear a great resemblance to the class last described. They have hitherto been found chiefly, if not entirely, in Ireland and Scotland. They were first brought into notice by Sir W. R. Wilde, in the proceedings of the Royal Irish Academy for 1840, and several were subsequently described by Mr. Shirley and other writers. The Catalogue of the Museum of the Royal Irish Academy contains notices of several crannoges.[1] They have also been found in some

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[1] When this Catalogue was published, about forty-six crannoges were known

of the Scotch lakes, especially in Dowalton Loch. The crannoges, at least in Ireland, were frequently, but not exclusively, placed on natural islands, or on shallows which approached to this character; sometimes they were built up from the bottom of the lake, exactly in the manner of the fascine dwellings of Switzerland. They are surrounded by a stockade of piles driven into the bed of the lake, so as to enclose either a circle or an oval; the diameter varies from 60 to 130 feet. These piles are usually in a single row, but sometimes the rows are double and even treble. Occasionally the piles are beams, not round stems. The lowest bed within this enclosure is commonly a mass of fern, branches, and other vegetable matter, generally covered over with a layer of round logs cut into lengths of from four to six feet, over which is usually found a quantity of clay, gravel, and stones. In almost every case a collection of flat stones was discovered near the centre of the enclosure, apparently having served as a hearth; in some instances two or three such hearths were discovered at different parts of the crannoge. Generally one or more pair of querns were found in each crannoge.[1]

It will be seen that the crannoges have a great analogy to the fascine dwellings of Switzerland. This similarity is very striking, when we consider that the Swiss dwellings were evidently places of permanent habitation, that families, and perhaps tribes, lived on them; while the crannoges, as mentioned by Mr. Stuart, are chiefly to be regarded as chieftains' forts, and fastnesses for occasional retreat. Unlike the fascine dwellings of Switzerland, which belong chiefly, if not exclusively, to the Stone period, the crannoges, whatever may be the age of their foundation, continued down to the Iron period; nay, they were actually used at a very late date. In 1246, "Turlough, the son of Hugh O'Conor, made his escape from

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in Ireland—viz., twenty in Leitrim, twelve in Roscommon, two in Cavan, six in Monaghan, and one in each of the counties of Limerick, Meath, Westmeath, Down, King's County, and Tyrone.

[1] See Report upon the Presentation of Antiquities by the Board of Works, by William T. Mulvany, in the "Proceedings," vol. v., App. p. xliv. Wilde, "Cat. Mus. Royal Irish Acad." pp. 220—235.

the crannoge of Lough Leisi, in autumn, having drowned his keepers."[1] So late as in A.D. 1603, Hugh Boy O'Donnell, having been wounded, "was sent to crannog-na-n-Duini in Ross Guill, in the Tuathas, to be healed."[2] This wooden house of Duini was situated in the parish of Mevagh, county of Donegal, between Redhaven and Sheephaven.[3]

The lake-dwellings of Switzerland, as far as we at present know, disappeared about the first century of our era.

SUPERSTRUCTURE.

Under this head there is naturally very little to be said. Except under very peculiar circumstances, timber and vegetable material cannot possibly exist long when exposed to the summer's sun and the winter's storms. Still there are indications, although slight ones, as to the construction of the huts.

Upon the main platform it appears that a bed of mud, loam, and gravel was laid, and beaten down firmly, either by the feet, or by wooden mallets of which several have been found. Occasionally a layer of larger pebbles is met with near the top, as in some of the Italian dwellings; probably this was intended to strengthen the plaster floor.

There can be no doubt that small piles or stakes formed the framework of the huts. Some of these have been found projecting considerably above the platform. Probably in some cases, especially in the fascine buildings, fresh piles, which did not go quite down to the bottom of the lake, were driven in for this purpose; but in the regular pile-dwellings, they would only be piles of an extra length.

Of course these piles would mark out the extent of the dwellings themselves, and in one or two favourable instances the ground plan of a settlement has thus been indicated; we have, however, more than this: the size of the house is further marked out by boards forced in firmly between the piles, and resting edgeways on the platform, thus forming what at the present day we should call the skirting boards of the huts or rooms. It cannot now be determined whether this was continued higher than a single board, as no more than this has yet been discovered; but the advantage of even a single plank, set on edge, to keep out wet, wind, and vermin, is quite evident. It is also certain that the walls or sides were in a great measure made of a wattle or hurdle-work consisting of small branches, woven in between the upright piles, and covered with a considerable thickness of loam or clay. This is proved by the presence of numerous pieces of half-burnt clay, upon which the impressions of the wattle-work still remain. These singularly illustrative specimens are found in nearly every settlement which has been destroyed by fire.

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[1] "Annals of the Four Masters."

[2] Ibid.

[3] Wilde, "Cat. Mus. Roy. Irish Acad.," p. 233.

The evidence hitherto collected proves that the greater number of the huts were rectangular; but some of them may possibly have been round; from passages in the works of ancient writers, it is evident that the huts of many nations on terra-firma were round in form, and remains of some ancient circular huts have been discovered in a lake-dwelling in Mecklenburg.

It is not known whether the huts were divided into several rooms or not; possibly further discoveries may decide this. From the remains of straw and reeds found in every lake-dwelling, it seems almost certain that the huts were thatched with these materials, and it is highly probable that the dormitories were strewed with the softer kinds of straw or hay.

Each hut had its hearth, consisting of three or four large slabs of stone; and it is probable, from the almost universal prevalence of of clay loom-weights, that most, if not all, of them were furnished with a loom. Portions of young trees with the branches partially lopped off are also not uncommon in these dwellings; these would be very convenient, if fastened to the roof or the walls, for the suspension of mats, tools, fishing-nets or vessels of pottery.

The objects in the collection were obtained chiefly from the settlements at Moosseedorf, Robenhausen, and Wangen—all of which stations belong to the Stone period. Some particulars of each station may be desirable before a general description of the objects is given.

MOOSSEEDORF.

The settlement in this lake is peculiarly interesting on several accounts; it affords the most perfect example of a regular lake-dwelling of the Stone period; and from the lake having been artificially lowered, a great number of the piles placed near the bank were laid dry.

The small lake of Moosseedorf, distant about two hours' walk from Bern, belongs, as its name implies, to that numerous class of lakes in Switzerland called "Moor lakes." Its banks are boggy, the bottom is muddy, and the water is thick in summer. After the water level had been lowered about eight feet in the winter of 1855-6, the remains of two settlements were discovered, one towards the eastern and the other near the western extremity. The investigations were conducted by M. Albert Jahn, of Bern, and Dr. Uhlmann, of Münchenbuchsee, and the results were given by them, with great accuracy, in a monograph entitled "Die Pfahlbau-Alterthümer in Moosseedorf, Bern, 1857."

The eastern settlement, or at least its site, is now in a great measure on dry land; it was formed by a parallelogram of piles driven irregularly into the muddy bottom, and was about fifty-five feet broad, and seventy feet long. The piles consist of stems of fir, oak, birch, and aspen, being the kinds of wood found in the neighbourhood; they are from five to seven inches in thickness, some whole, some split, and many with the bark still remaining. Cross branches resembling a faggot road, probably indicate the causeway which connected this settlement with the shore. Here, as in many other lake-dwellings, the upper structure had been destroyed by fire, and only the burnt wood remained.[1]

In connection with the settlement of Moosseedorf a discovery made in the immediate neighbourhood is worthy of notice. Every little hillock in the surrounding marshland, still partially covered with peat and hardly rising above its level, appears to have been a place where flint was worked into implements, for scarcely anything but flint was met with in any of them; more than a thousand pieces of flint in flakes, cores, or implements, were found in these localities. The flakes are of various sizes, from that of fish-scales up to two inches in length.

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[1] Keller, *l.c.*, p. 33.

The colour of these flints varies; they are found white, brown, black, red, and bluish, of all shades, also translucent and like agate and chalcedony. The greater part appear to have come from the Swiss Jura (chalk), some few from the Alps. Those of a better quality are doubtless of foreign origin.

The tools used for making these flint implements do not seem to have been of the same material, but of "gabbro," a bluish-green, very hard, and tough kind of stone. Several of these hammer-stones have been met with; their form is very simple, and varies between a cube and an oval. The oval specimens were ground down in one or two places, and the most pointed part was used for hammering.[1]

ROBENHAUSEN.

Robenhausen is a pile-settlement on the lake Pfäffikon, to the north of the lake of Zürich.

Some years ago, ancient implements were met with in the peat near Robenhausen. In January, 1858, however, remains of an extensive lake-settlement were found by Herr Jacob Messikomer, in that part of the moor known as Himeri. Excavations were commenced on a small scale by the Antiquarian Association of Zürich, and subsequently the works connected with the outlet of the water afforded great facilities for the investigation. The careful examination of this remarkable settlement was subsequently undertaken by Herr Messikomer, to whom the public are indebted for an account of the size of the settlement, the construction of the dwellings, and the antiquities which have been found at this station.

The lake-settlement is situated in the peat moor on the southern side of the lake of Pfäffikon. The space covered with piles is nearly three acres; it forms an irregular quadrangle about 2000 paces from the ancient western shore of the lake, the whole of this distance now consisting of peat, and about 3000 from the shore in the opposite direction. It was with this last-named side that the settlement, which of course was formerly entirely surrounded with water, communicated by means of a bridge or stage, of which the piles are still visible. The reason why the communication with the land was made in this direction, and not on the side where the land was nearer, appears to be that the gardens and pastures of the colony lay in the sunny district of the village of Kempten.

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[1] Keller, *l.c.*, p. 36.

The substructure of these dwellings was of piles, consisting partly of whole and partly of split stems ten or eleven feet in length, of oak, beech, and fir-wood, sharpened at the end with stone-hatchets, and driven a few feet deep into the mud at a distance of from two to three feet apart.[1]

The floor or platform supporting the huts was formed, as is evident from the remains still existing, partly of cross timbers and partly of boards, which were fastened to the upright piles by wooden pins. The outermost piles were bound together with hurdle-work of branches, large pieces of which have been found.

It is curious that in many cases objects are found together which have a certain mutual relation. In one place a considerable quantity of corn (wheat and barley) was found associated with bread; in another locality these articles of food were found together with burnt apples and pears; in a third, flax and its different manufactures; and in a fourth, spun flax was discovered associated with the burnt-clay weights used for the loom. There can be no doubt that in the first-named two localities there were store-houses of different kinds of grain, and that in this very place the corn was bruised and ground, and afterwards either boiled in pots to a kind of porridge, or made into dough with water without separating the bran, and then baked into a kind of cake on hot stones, and under the glowing embers. The large number of granite slabs used for mealing or grinding stones, prove that the manufacture of meal was carried on here to a considerable extent. The third and fourth localities indicate a large store of flax, which is found here sometimes in skeins or hanks, sometimes spun, plaited, or woven into nets, mats, or cloth, just as in a linen-merchant's warehouse.

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[1] Five of the piles at Meilen, in the best state of preservation, and consisting of fir-wood, were examined by carpenters and joiners, and their unanimous opinion was, that from the nature of the strokes the hewing, or rather the hacking of the points indicated very clearly the use of the stone hatchet, and that no tool of any kind of metal had been employed about the work. In order to test the possibility of working timber with such tools, and to prevent any doubt which might arise, several trials were made with stone implements, and Dr. Keller was perfectly convinced of the correctness of the conclusions. It must, however, be remarked that the trials were made with green wood, and that very probably the builders of the lake-dwellings did not use dry timber, but fresh wood, just as it was brought from the forest. (Keller, *l.c.*, pp. 20, 21.) With regard to the length of the piles, Sir John Lubbock mentions, ("Prehistoric Times," p. 130) that Colonel Suter extracted two piles from the lake-village of Wauwyl, one of which was 14ft. 6in. in length, of which 4ft. was in the peat, and the remaining 10ft. 6in. in the sand beneath; the other was only 8ft. 6in. in length, 4ft. of which was in the peat, and the other 4ft. 6in. in the solid ground.

According to the calculation of Herr Messikomer, the area of ground examined by him contains about 4000 square feet, which is about one-thirtieth part of the whole settlement. At least 100,000 piles must have been used in the whole structure; and if we join to this consideration, the fact that the bones and fragments of pottery were so abundant that every shovelful of mud taken from the bottom of the canal, at a depth of six or seven feet, contained several specimens, and also that the animal remains and the products of human industry here form a bed at least three feet in thickness, called the "relic bed," it seems perfectly certain that the settlement lasted many centuries.

Several most interesting specimens were brought to light in the course of the excavations made by Herr Messikomer, amongst which were a number of wooden bows for shooting arrows, some of which were quite perfect; stone hatchets mounted in their original wooden handles; a stone hatchet fastened in a haft of stag's-horn, which was then fixed in a wooden handle; a flint arrow-head attached to the shaft with cord and asphalt; and lastly, a remarkable canoe, made out of a single trunk (Einbaum), such as may now be seen in the lakes of Zug and Lucerne, twelve feet in length, one and a half foot in breadth, but only five inches in depth.[1]

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[1] Keller, *l.c.*, pp. 38—41.

When the settlement of Robenhausen was founded, peat had already begun to form; this continued to grow amongst the forest of piles, treasuring up in its bosom such implements and objects as fell into the water. In this bed of peat can be traced most clearly the different relic beds which belonged to the successive settlements, as will be seen from the following extract from the report made by Herr Messikomer to the Historical Society of Switzerland, in August, 1865:—

"Anyone who takes the trouble of descending into one of the excavations made in the area of this settlement, will observe, at the depth of about ten or eleven feet below the surface, a bed of a whitish-grey colour, consisting of the remains of innumerable small shells, and here called 'Weisser Seegrund' (white lake-bottom, or, shell-marl,) but in Thurgau it is called 'Alb.'[1] In this bed no traces of implements are found, but the points of the lowest series of piles have been driven into it. Above this there is a bed about four or five inches in thickness, greasy and sticky to the touch, arising from the decomposition of the remains of plants, and having the appearance of peat. Implements are found in this bed, but not abundantly. Above this lies a bed of charcoal, arising from the conflagration of the first settlement: it contains grains of barley and wheat, also threads and pieces of cloth, and fishing nets, all in beautiful preservation from having been carbonised. From all appearances this first settlement was not of long duration.

"After the catastrophe which had happened to the first dwellings, the colonists erected new huts on the site of their old ones, for above the lowest bed of charcoal we find a bed of peat three feet in thickness, in which are embedded bones, pottery, &c., and also the material of an ancient flooring. Then follows again a bed of charcoal with corn, apples, pieces of cloth, bones, pottery, and the usual implements of stone and bone. The huts of this *second* settlement were likewise destroyed by fire, as may be clearly seen by the burnt heads of the second series of piles. This settlement was erected more firmly than the previous one, for the piles are so numerous that on the average there are three or four in every square foot. The length of time also that this settlement lasted was much greater, as the bed of peat formed during its existence is much thicker.

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[1] This "Seegrund," or shell-marl, which covers the bottom of all the smaller lakes lying in the low districts, and which varies in thickness from a few inches to some feet, and is occasionally burnt for lime, is to be distinguished from the "blancfond," which consists of the whitish crust of carbonate of lime, with which the bottom of the larger lakes is partially covered.

"Above the second bed of ashes another bed of peat occurs about three feet in thickness; in this there are also the remains of a flooring, as well as a number of stone hatchets, either broken, half-finished, or in good preservation, some of them being of nephrite.[1]

"Pottery was found at Robenhausen, as well as other things usually met within lake-dwellings. The third settlement must have lasted a long time, but it seems only to have extended over a part of the whole area. It is a singular fact that while the piles of the two first settlements reach down to the shell-marl, those of the third settlement were driven into the mass of ground or material arising from the two first settlements. The piles of the upper settlement also consist entirely of split trunks of oak, while those of the two lower ones are round stems of soft kinds of wood. It is also remarkable that in the remains of this third erection no signs of any catastrophe by fire are to be discovered, and we may therefore venture to conclude that the colonists, probably compelled by the increase of the peat, left these abodes of their own accord.

"The reason why no corn, apples, or manufactures of flax are found in the upper layer may probably arise from the fact that the latest erection was not burnt; for nearly all the specimens of the above descriptions which have come down to us are in a carbonised condition.

"The uppermost bed of the lake-dwelling area consists, like that of the rest of the moor, of vegetable mould. For when the peat had reached to the surface of the water, its growth was checked, and, by the decay of the marsh plants under the influence of the atmosphere, a bed of vegetable mould was formed called peat-earth, which covers the surface of every peat moor.[1]"

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[1] This material Dr. Keller thinks was obtained from the East. (Keller, *l.c.*, p. 18.) M. Gabriel de Mortillet is of a different opinion. He considers that this substance is not nephrite, but a variety of serpentine derived from the Alps. ("Matériaux pour l'Histoire de l'Homme," vol. i., p. 126.) He has examined the implements of "nephrite" preserved in the collections of M. Desor at Neuchâtel, of Colonel Schwab at Bienne, of Dr. Uhlmann at Münchenbuchsee, and of the late M. Troyon at Lausanne, and in each case he has convinced himself that the material was obtained from the silicious veins which occur in the local serpentines. (Matériaux, *l.c.*, vol. i., pp. 231—233.)

One of the settlements at Robenhausen appears to have been destroyed by fire during the prevalence of the powerful south wind, so well-known in Switzerland as the "Fönwind," by which the burnt materials of the huts were driven across the muddy surface in the exact course of the wind. Herr Messikomer has arrived at this conclusion from the discovery of a strip of peat containing a large quantity of charcoal, only a few hundred paces in breadth, having its limits clearly defined on either side, and which lies in the precise course that the Fönwind would have taken. Dr. Keller supports this view, and appeals to the experience of those who have witnessed the effect of the Fönwind occurring at the time of a calamity of this nature, by which, he adds, "at one time or other nearly every town in central Switzerland has been almost destroyed."[2]

Dr. Keller considers that each hut was inhabited by one family, which had its own arrangements for preparing victuals, and for spinning and weaving the clothing needed by the inmates. This opinion is founded in part upon the discovery, made by Herr Messikomer, of six huts at Robenhausen which had stood close to each other, in each of which was a stone corn-crusher, a quantity of corn, pieces of woven cloth, stores of raw flax, together with clay loom-weights, and great stones which had formed the hearths. The length and breadth of these huts correspond exactly with those of some dwellings examined at Niederwyl, namely, twenty-seven feet by twenty-two.[3]

WANGEN.

When the first account was published of the discovery of pile-dwellings, at Meilen, Herr Löhle remembered having seen similar remains near his house at Wangen, and accordingly, in the autumn of 1856, he began to collect the antiquities found on the shore of the Untersee. He subsequently excavated and laid bare a considerable portion of the area occupied by the settlement, and was rewarded by the discovery of several things which he had not previously met with, such as ears of barley and woven linen cloth, besides a very large number of stone and bone implements.

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[1] Keller, *l.c.*, pp. 43, 44.

[2] Ibid, p. 47.

[3] Ibid, p. 46.

The lake-settlement of Wangen lies to the east of the village; the piles run along the shore, now partially encroaching upon it, and form a parallelogram of more than seven hundred paces long and one hundred and twenty paces broad.[1]

The piles consist of the different kinds of wood growing in the neighbourhood—viz., oak, beech, elm, birch, fir, ash, alder, maple, and two kinds of willow. They are either whole stems, or they are trunks split into two or three parts; and they have been sharpened in some cases by fire, and in others with stone hatchets.

They were driven in for the most part one or more feet apart, so that in the space of a square rod there are at least twelve, though sometimes seventeen or twenty-one may be seen. In some places, however, where a firmer support was necessary, three or four piles are found driven in close together. The whole number of piles forming the substructure of this settlement is estimated by Herr Löhle at from 40,000 to 50,000.

Of all the lake-dwellings of the Stone period yet examined, not one has afforded such an abundance of implements as Wangen; they were found in the "relic-bed," about two feet below the surface. Many hundreds of stone hatchets were obtained of different sizes and shapes, and in every stage of manufacture, a convincing proof that they were made on the spot.[2] The workmanship of the stone implements found at Wangen is very inferior to that of the corresponding objects met with at other stations.

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[1] Keller, *l.c.*, p. 60.

[2] The stone hatchets and implements found at Meilen were also manufactured on the spot. Not only have they been met with in all stages up to the finished tool, but the waste fragments are also present. (Keller, *l.c.*, p. 19.)

Cylindrical hammers of serpentine, with a haft hole, and indeed perforated stone tools of any kind, are the greatest rarities; whilst stone hammers of a cubical form, with the edges rounded, made out of hard sandstone, are very numerous. Cutting tools of flint, such as saws hafted in wood and fastened with asphalt, and flint-arrow and lance-heads, are found in tolerable abundance. As the kind of flint of which they are made is chiefly met with in the neighbouring parts of France, it is probable that the material was obtained by barter.

Pointed tools, chisels, arrow-heads, &c., made of the bones of red-deer, roe-deer, and other animals, and even of birds, have been found in large numbers and of a great variety of shapes; so also have large pointed implements, awls or piercing tools, daggers and lance-points made from stags' horn. Some of the bone arrow-heads have the asphalt still remaining which helped to fasten them to the shaft.[1]

The earthenware vessels are not different, either in form, material, or style of ornamentation, from those found at Meilen, Robenhausen, and Moosseedorf. Most of them are of very simple form, approaching that of a cylinder, and many are coated either inside or outside with a thick covering of soot.

Spindle-whorls of clay are found in abundance. Perforated balls of clay, mixed with a large quantity of charcoal-powder, like the material of the conical loom-weights found at Robenhausen, are also met with by dozens. Grinding stones and hearth-stones are very abundant.

Large quantities of corn have been found, both in whole ears and in separate grains, but always in a burnt state: the two-rowed barley *(Hordeum distichum)*, and wheat, both of excellent quality, may be easily recognised. Of wheat there are two varieties, the common wheat and the two-rowed corn, or what is called summer corn. In one place where there was doubtless a store, more than a bushel was found. The fruits of the wild apple and of the wild pear were also met with in a similarly carbonised condition.

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[1] Keller, *l.c.*, pp. 61, 62.

In the course of several excavations which have been made by Herr Löhle, he believes that altogether he has obtained nearly one hundred bushels of corn of various kinds, so that there can be no doubt that the lake-dwellers carried on agriculture to a considerable extent. It is also a matter of peculiar interest to find that, in one of his later excavations, Herr Löhle has discovered baked bread, made of the crushed corn, precisely similar to that found about the same time by Herr Messikomer at Robenhausen. Of course it has been burnt or charred, and thus these interesting specimens have been preserved to the present day. The form of these cakes is somewhat round, about an inch or an inch and a half high—one small specimen, nearly perfect, is about four or five inches in diameter. The dough did not consist of meal, but of grains of corn, more or less crushed. In some specimens the halves of grains are plainly discernible. The under side of these cakes is sometimes flat, sometimes concave, and there appears no doubt that the mass of dough was baked by being laid on hot stones and covered over with glowing ashes.

It was not entirely for the production of corn that the ground was cultivated; the growth and manufacture of flax evidently occupied no small share of the attention of the lake-dwellers: flax is found in all stages, from the unworked stems with the seed-capsules still adhering to them, and in perfect preservation, to specimens of plaited or woven cloth.

In the same bed of mud which contained the remains of piles and household implements, there were found, as in other lake-settlements, quantities of moss, rushes, bark of trees, wisps of straw, and small twigs, part of which probably formed the roofs of the huts, and part may have served for the bedding of the inhabitants.

Besides the different kinds of wood used for piles, as before stated, some other kinds were found at Wangen, such as the hazel, the apple, and the pear tree. The stems of the two last were not used for piles, but for hewing-blocks on which the people worked; they were found lying down and partially burnt: they are about a foot and a half in diameter, and two or three feet in length. Fir-wood and the kinds allied to it are rare, doubtless because it was not to be obtained conveniently; for the pine forests are on the mountain heights, at some distance from the shore.[1]

Herr Löhle has observed that the antiquities at Wangen are by no means evenly spread over the whole area of the settlement, but there are certain places where they are found in greater abundance than in others; and there are also places which have proved entirely barren, even after a very careful search. Thus the burnt or charred flax is only found in certain localities tolerably well defined, and from four to six square rods in extent; but it is there found in all stages of manufacture, in stems with the seed-vessels still remaining; in bundles, or what are technically called "heads," very well put together; spun into threads; or made into neat and artistic plait with bands of willow-bark or withy-peel. Dr. Keller thinks that Herr Löhle is quite right in supposing that near these places must have been the spinning-rooms of the inhabitants, or their store-rooms for flax in its different stages. In the same manner there are localities where straw and straw-plait are plentiful.

There are also certain other peculiarities respecting the antiquities found at Wangen which are worthy of notice. Notwithstanding the very large area which has been examined, and the great quantity of stone-implements which have come to light, only one single case has occurred of a hatchet having been hafted in stag's-horn like those which are found abundantly in nearly all the older lake-settlements. The mode in which the stone hatchets were here almost exclusively hafted was by means of a forked branch of a tree, one portion of which, intended to receive the hatchet, was cut off some inches above the joint or point of junction, and then split; the other was left long, so as to be used as a handle. As in the case of similar implements made by the North American Indians, it was quite necessary, in order to fasten the hatchet, to have the two parts of the split branch bound round tightly by strings of bast, or vegetable fibre, flax cords, or thongs of leather. From the difference in the length of the handles, Herr Löhle concludes that some of these tools were for use with one hand and others with both hands.[1] The kinds of wood used for these handles were chiefly the hazel and the willow.

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[1] Keller, *l.c.*, pp. 62, 63.

One or two more peculiarities of the settlement of Wangen may be mentioned: the perforated balls of clay, mixed with charcoal, seem to be found in no other station; while the black perforated cones of similar material, so abundant at Robenhausen, are not met with here.

On the whole, this settlement appears to belong purely to the Stone period, and this is the more remarkable as the inhabitants evidently were pre-eminent both as agriculturists and as handicraftsmen. They cultivated many sorts of corn and flax, and they manufactured several descriptions of both plaited and woven cloth. All these productions, the result apparently of a settled mode of life, and of peaceful industry, stand in striking contrast with the wretched implements and tools of bone, stone, and wood, which were in daily use by them.[2]

FAUNA OF THE SWISS LAKE-DWELLINGS.

All the animal bones found upon the sites of the pfahlbauten are in the same fragmentary condition as those from the kjökkenmöddings. They also bear the marks of knives, and certain of them have been opened for the sake of the marrow. Bones of *urus, auroch,* and *elk,* none of which are now living in Switzerland, are present with the antiquities of the pfahlbauten. The domestic cat and the barn-door fowl are absent, both from the lake-habitations of Switzerland and from the kjökkenmöddings of Denmark. Some curious evidence of the relative age of pile-dwellings of the Stone period is afforded by the animal remains found at the different stations. Thus, at the older settlements, such as Moosseedorf and Robenhausen, remains of the stag are more abundant than those of the ox. At the more modern stations of Wangen and Meilen, the reverse is the case. The domestic hog of the present race is absent from all the pile-settlements of the Stone period, excepting the one at Wauwyl.

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[1] The Klah-o-quaht Indians use their shell adzes either with one hand or with both, according to the size of the tool.

[2] Keller, *l.c.*, pp. 64, 65.

OBJECTS FROM THE PILE-DWELLINGS OF SWITZERLAND ARE SHOWN IN CASES A 31 to A 33, B 26 to B 29, C 19 to C 21, and D 20 and D 21.

Many of the stone hatchets found upon the sites of the Swiss lake-settlements are still in the original sockets, made of stags' horn. A piece of the antler was cut off the requisite length and thickness, in which a hole was worked out at one end, wide and deep enough to receive the upper end of the hatchet. The other end was cut into a four-sided tenon or plug, which fitted into the wooden handle. Several of these stags' horn sockets may be seen in the collection, as well as models of perfect implements, complete in all three parts, found at Moosseedorf and Concise. In some instances the stone hatchet was bound to a wooden handle, without any intermediate socket; in other cases, the whole of the handle is of stag's horn. Stone hatchets are shown from the lake-settlements at Wangen, Moosseedorf, Concise, Lausanne, and Robenhausen. Almost every variety of type exists among the stone hatchets found in the pfahlbauten; the section of some is absolutely circular, with all intermediate forms, to an elongated oval; others are in section, rectangular, but made with curved lines; whilst some range in section, from a square to an elongated rectangular figure. It has been suggested that many of the stone hatchets were used unmounted; out of the large number found at Nussdorf only three were met with in sockets of stags' horn, and all of these belong to the smaller implements with the rectangular section.[1] It is probable, therefore, that only the smaller hatchets were hafted, and that the larger implements, with a round or oval section, were complete tools in themselves and needed no handles.[2]

Drilled stone axes are much more rare at lake-villages of the Stone period, such as Nussdorf, than ordinary stone hatchets. Only 50 with drilled holes were found at Nussdorf, and very few of these are perfect;[3] some of them are very nicely worked, and probably are referable to a late period in the Stone age.[1]

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[1] Keller, *l.c.*, plate xxvii., figs. 16 and 19.

[2] Ibid, p. 109.

[3] Ibid, plate xxvii., figs. 4, 11, 22, and 24, all of which are broken across the haft-hole.

The flint used by the lake-dwellers was probably obtained by barter. This is quite in accordance with what is known to be the practice with modern savages. For instance, in Australia the special products of each district, pipe-clay and red ochre, drinking cups and cockatoo's feathers, and especially "a much-esteemed kind of flint from the North,"[2] are conveyed by barter from tribe to tribe on the vast continent.[3]

The presence of flint on the shores of the western arm of the Lake of Constance (Ueberlinger See) actually led to the discovery of lake-settlements in the neighbourhood. The inhabitants had been accustomed, from time immemorial, to draw their supplies of flint exclusively from the shores of the lake. Herr Ullersberger was led to consider that this great abundance of flint, in a district where it does not occur naturally, could be explained only by the supposition that the whole of the material had been taken there by man. Acting upon this conviction, he carefully examined the available localities on the shores of the Ueberlinger See, in the winter of 1862-3, and discovered the remains of five lake-settlements, two of which, Nussdorf and Maurach, are of the Stone period; the other three belong to the Bronze period.

Among the flint implements shown in the collection, are scrapers, arrow-heads, and a flint saw in its original wooden handle, to which it is fastened with asphalt.

The asphalt used by the lake-dwellers was probably obtained at Val Travers (Canton of Neuchâtel), in Alsace, or at Seyssell, near the "Perte du Rhone." A small drinking cup made of asphalt has been found at Robenhausen. Asphalt also served for mending broken pottery. Not only were stone hatchets fastened to their handles and flint arrow-heads attached to their shafts with this substance, but it has actually been used as a material for handles. A bone awl with a handle made entirely of asphalt has been found at Moosseedorf.[1] A lump of asphalt was found at Wauwyl; this is probably the raw material which had been taken there for future use.[2]

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[1] Keller, *l.c.*, plate xxvii., fig. 23, A and B, and fig. 22.

[2] A. G. Oldfield, "Trans. Ethnol. Soc.," vol. iii. (1865), p. 269.

[3] "Quarterly Review," No. 250, Oct. 1868, p. 432.

In Dr. Clément's collection at the Paris Exhibition, 1867, were some bone and flint arrow-heads retaining portions of the bitumen by which they had been attached to the shafts. Flint arrow-heads, still fastened to the original shafts, have been found in the lake-dwellings, as well as bows of yew wood.

Grindstones, hearth-stones, mealing-stones and hammer-stones are shown from Wangen, Concise, and Moosseedorf; as well as chisels and pointed implements of bone and stags' horn for these stations and Robenhausen. Fragments of pottery are shown for all four settlements. The potter's wheel was probably unknown to the lake-dwellers of the Stone period;[3] the baking of the pottery is very imperfect, and appears to have taken place in an open fire. The material is usually rude and coarse. Many of the vessels have small projections, which are pierced in such a manner that strings might be passed through them to serve as handles. Some of the vessels, also, are pierced by small holes at different levels; it has been suggested that these may have been used in the preparation of curds, the small holes being intended to permit the escape of the whey. No representation of any animal has yet been observed upon pottery found in lake-settlements of the Stone period.[4]

FLORA OF THE SWISS LAKE-DWELLINGS.

All the cultivated plants of the pfahlbauten show a connection with the countries of the Mediterranean; every kind of corn came from that quarter; the lake-dwellers not only cultivated the same barley, but even the same variety as the inhabitants of Southern Italy. Lest it might be supposed that seeds and objects of later times have become mixed with those belonging to the lake-settlements, it is satisfactory to know that in the old seeds, the inside portions, the germ and albuminous part, have disappeared, and only the burnt cellular part, which forms the seed-shell, or pericarp, has remained.

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[1] Keller, *l.c.*, p. 54, p. 34, plate xiv., fig 21.

[2] Ibid, plate xx., fig. 8.

[3] Pottery made on the wheel has been found at Concise.—Keller, *l.c.*, p. 179.

[4] Lubbock, "Pre-historic Times," 2nd edition, p. 185.

The destruction by fire of several of the lake-villages, strange as it may appear, has really preserved many interesting objects, of the existence of which we should otherwise have remained in ignorance; such specimens are found in a carbonised state, charcoal being very imperishable. The origin of these conflagrations has been explained in two ways. Dr. Keller and others consider that they have arisen from ordinary causes, the late M. Troyon was of opinion that they resulted from the attacks of enemies; if so, as Sir John Lubbock has remarked, we ought to have found remains of the slain, whereas human remains are very scarce in the lake-settlements,[1] and it is probable that the presence of those that are met with has resulted from accident, particularly as the remains of adults are less numerous than those of children.[2]

SEEDS FROM THE SWISS LAKE-DWELLINGS ARE SHOWN IN CASE B 26.

CEREALS.

Specimens are shown of compact six-rowed barley (*Hordeum hexatischum densum*), and of the small lake-dwelling barley (*H. hexast. sanctum*). Of small lake-dwelling wheat (*Triticum vulgare antiquorum*), and of beardless compact wheat (*T. vulg. compactum muticum*).

Of the Cereals from the lake-dwellings the small lake-barley (*Hordeum hexastichum sanctum*), and the small lake-dwelling wheat (*Triticum vulgare antiquorum*) are the most ancient. Next to these come the beardless compact wheat (*T. vulg. compactum muticum*), and the larger six-rowed barley (*H. hexast. densum*).

It is believed that the lake-dwellers prepared and sowed their fields in the spring, and not in the autumn.

It is also probable that the corn was not cut off just under the ears (a mode represented on some Italian coins), but that the straw was taken with it; otherwise there would not have been the seeds of so many weeds with the corn. The six-rowed barley is faithfully delineated on coins of Metapontum, belonging to about the 6th century B.C. This barley is still more accurately given on coins of the 5th century B.C. On the coins of Leontini, an ancient Sicilian town, grains of the ancient type of barley are represented; they exactly agree with those of the small lake-dwelling barley.

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[1] "Pre-historic Times," 2nd edition, p. 212.

[2] Ibid, p. 207.

In addition to the varieties of wheat and barley shown, the following cereals have been found in the pfahlbauten:—Egyptian wheat (*Triticum turgidum*); spelt (*Triticum spelta*); lake-dwelling "Emmer" (*Triticum dicoccum*); oat (*Avena sativa*);[1] rye (*Secale cereale*);[2] millet (*Panicum miliaceum*), and Italian setaria (*Setaria Italica*).

Specimens of bread (burnt) from Robenhausen and Wangen are shown.

When the Aa canal (Robenhausen) was deepened and altered the quantity of bread found was considerable. The entire weight was about 8lbs., which would probably correspond with newly-baked bread weighing about 40lbs.[3] This bread should more correctly be called cake, for no leaven appears to have been used. The cakes have been met with both round and flat, from one inch to fifteen lines thick, and with a diameter of four or five inches.[4] The bread hitherto found has been made of wheat or millet. Barley bread has not been met with; this grain was probably eaten parched or roasted.

WEEDS OF THE CORNFIELD.

These seeds of weeds appear to have been equally charred with the grains of corn, and probably were mixed with it. One of the most interesting facts connected with this subject is the presence of two weeds of the cornfield, which are not indigenous to Switzerland, but were probably imported with the seed corn, the Cretan catchfly (*Silene Cretica*), and the corn blue-bottle (*Centaurea cyanus*); the former is spread over all the countries of the Mediterranean, and is found in the flax-fields of Greece, Italy, the South of France, and the Pyrenees; the original home of the corn blue-bottle is Sicily. The presence of these weeds indicates the way by which corn had come into the hands of the Swiss lake-dwellers.

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[1] Oats were cultivated during the Bronze period, but are absent from all settlements of the Stone age.—"Pre-historic Times," 2nd edition, p. 204.

[2] Sir John Lubbock states that rye does not occur in the lake-dwellings.—"Pre-historic Times," 2nd edition, pp. 204, 206.

[3] Keller, *l.c.*, p. 48.

[4] "Pre-historic Times," 2nd edition, p. 204.

The following weeds of the cornfield have been found in the pfahlbauten :—Cretan catchfly (*Silene Cretica*), corn-cockle (*Agrostemma githago*); white champion (*Lychnis vespertina*); sandwort (*Arenaria serpyllifolia*); goosegrass (*Galium aparine*); burdock (*Lappa major*); corn bluebottle (*Centaurea cyanus*); spurry (*Spergula pentandra*); creeping crowfoot (*Ranunculus repens*); white goosefoot (*Chenopodium album*); striped-seeded goosefoot; darnel (*Lolium temulentum*).

Out of this series seeds of the white goosefoot only are in the collection.

CULINARY VEGETABLES.

Seeds of parsnip (*Pastinaca sativa*), are shown; seeds of the pea (*Pisum sativum*), have been met with at Moosseedorf; but the Celtic field-bean (*Faba vulgaris Celtica*), and lentil (*Ervum lens*), have only been found in lake-settlements of the Bronze period.

FRUITS AND BERRIES.

Crab-apples (*Pyrus malus*); the large round lake-dwelling apple (*Pyrus malus cult.*); and apple pips are shown, as well as cherry stones (*Prunus avium*); sloe stones (*Prunus spinosa*); and bird cherry stones (*Prunus padus*). Of stone fruit more sloe than cherry stones have been found. Raspberry seeds (*Rubus idæus*); strawberry seeds (*Fragaria vesca*); seeds of the dog rose (*Rosa canina*); and seeds of the common elder (*Sambucus nigra*), are also shown.

Among the other kinds of fruits and berries which have been found, but are not included in the collection, are those of the service-tree (*Pyrus aria*); dwarf elder (*Sambucus ebulus*); bilberry (*Vaccinium myrtillus*); and wayfaring tree (*Viburnum lantana*).

The carbonised apples found upon the sites of the lake-dwellings are sometimes whole, but more frequently cut into halves. Large quantities have been obtained at Robenhausen; 300 or about half a peck were found together.

NUTS.

Specimens of hazel-nuts (*Corylus avellana*), beech mast (*Fagus sylvatica*), and water chesnuts (*Trapa natans*), are shown.

Dr. Heer has suggested that the quantities of beechnuts and acorns which have been met with, were probably intended as food for the swine.

The water-chesnut now only exists in Switzerland, in a tarn in the canton of Lucerne. It doubtless formed an article of food with the ancient lake-dwellers, who appear to have laid up stores of it; it is used for food at the present day in Upper Italy.

OIL-PRODUCING PLANTS.

Seeds of the opium, or garden poppy (*Papaver somniferum* var. *antiquum*), of dogwood (*Cornus sanguinea*), and of henbane (*Hyoscyamus niger*), are shown.

AROMATIC PLANTS.

Caraway seeds have been found in the lake-dwellings, but no specimens are in the collection.

BAST AND FIBROUS PLANTS.

Flax seeds are shown. The flax of the lake-dwellers is not the common flax; the small-leaved flax (*Linum angustifolium*), a native of the countries of the Mediterranean, may be considered as the original stock of the cultivated flax of the lake-dwellers. The presence of the Cretan catchfly proves that the flax-seed came, originally, from Southern Europe. Sir John Lubbock calls attention to the absence of hemp from the Swiss lake-settlements, and remarks that "flax is mentioned in the Pentateuch and in Homer, it was also largely used by the ancient Egyptians, while hemp seems to have been unknown until a later period. Flax is mentioned nine times in the Old Testament, and linen thirteen times, but hemp not once."[1]

Hemp, however, was known to the ancients, although the use of it was probably very limited. According to Herodotus[2] garments were made of it by the Thracians. "They have among them a species of hemp resembling flax, except that it is both thicker and larger; it is indeed superior to flax, whether it is cultivated or grows spontaneously. Of this the Thracians make themselves garments, which so nearly resemble those of flax as to require a skilful eye to distinguish them: they who have never seen this hemp would conclude these vests to be made of flax." Hesychius (*v.* Κάνναβις) quotes the preceding remark of Herodotus, only saying that the Thracian *women* (Θρήϊσσαι) made *sheets* of hemp (ἱμάτια). In substituting these expressions he puts upon the words of Herodotus an explanation derived from his familiar knowledge of Grecian customs. To the present day hemp is produced abundantly in the vicinity of the countries which were occupied by the ancient Thracians; and a modern traveller informs us that "the men who drive the horses, which drag the boats upon the Danube between Pest and Vienna, now wear coarse tunics of hemp."[1]

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[1] "Pre-historic Times," 2nd edition, p. 206.

[2] iv. 74.

The next writer who mentions hemp after Herodotus is Moschion, rather more than 200 years B.C. He states that the magnificent ship Syracusia, built by the command of Hiero II., was provided with hemp from the Rhone for making ropes.[2] Hemp, as well as flax, was grown abundantly in Colchis.[3] It was brought to the ports of the Ægean Sea by the Ionian merchants, who were intimately connected with the northern and eastern coasts of the Euxine through the medium of the Milesian colonies. This fact may account for the cultivation of hemp in Caria. The best was obtained, in the time of Pliny,[4] from Alabanda and Mylasa in that country. Pliny also mentions a kind which grew in the country of the Sabines, and which was remarkable for its height.

Automedon, who lived a little before Pliny, complains in an epigram of a bad dinner given him by one of his acquaintances, and compares the tall stringy cabbages to hemp.[5] As this author was a native of

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[1] "Travels in Circassia, &c.," by Edmund Spencer, 1837, vol. i., p. 13.

[2] Apud Athenæum, l. v., p. 206. Casaub.

[3] Strabo, l. xi., § 17, vol. iv., p. 402, ed. Siebenkees.

[4] *l.* xix., *c.* 9.

[5] *Καννaβίνη* κράμβη. "Brunswick's Analecta," ii., 209.

Cyzicus, he would no doubt have abundant opportunities of becoming familiar with the plant.

Probably hemp was not the natural growth either of Italy, Greece, or Asia Minor, but was confined, as it still is in a great degree, to countries lying further north and having a colder climate. The intimate connexion of the Romans with the Greek colony of Marseilles may have brought it among the Sabines, as the active trade between the Euxine and Miletus may have introduced it into Caria. With the material its name was also imported; this is substantially the same in all the languages of Europe, as well as in many Asiatic tongues.[1]

PLANTS USED FOR DYEING.

Weld (*Reseda luteola*), is the only dye plant mentioned by Dr. Heer as having been found in the Swiss lake-dwellings; there is no specimen of it in the collection.

FOREST TREES AND SHRUBS.

The Swiss lake-dwellers used many kinds of timber; the following specimens of fir-cones, wood, &c., are in the collection :—Scotch fir cone (*Pinus sylvestris*); mountain pine cone (*P. montana*); spruce fir cone (*P. abies*); yew wood (*Taxus baccata*); yew seeds (*T. baccata*); oak wood (*Quercus robur*); birch leaves (*Betula alba*); ash wood (*Fraxinus excelsior*); mistletoe (*Viscum album*). They appear also to have used the silver fir (*Pinus picea*); juniper (*Juniperus communis*); and hornbeam (*Carpinus betulus*).

MOSSES.

Specimens of *Anomodon viticulosus*, and *Neckera crispa*, are shown.

PLANTS FOR PROCURING FIRE.

A specimen of common tinder fungus (*Polyporus igniarius*), is shown, from Robenhausen.[2]

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[1] See Yates "Textrinum Antiquorum," pp. 292—295.

[2] The Iroquois use a fungus which grows on the maple as *punk* in kindling a fire; another kind which is found on the birch is used when the former cannot

WATER AND MARSH PLANTS.

The character of the water and marsh plants shows that, at least at Robenhausen, the lake-dwellings were not erected over the deep and clear water of the lake, but on muddy shallows grown over with vegetation.

Seeds of the following plants, found at Robenhausen are shown:—Chara (*Chara vulgaris*); lake scirpus (*Scirpus lacustris*); marsh Scheuchzeria (*Scheuchzeria palustris*); yellow flag (*Iris pseudacorus*); pondweed (*Potamogeton perfoliatus*); pondweed (*P. compressus*); common hornwort (*Ceratophyllum demersum*); buckbean (*Menyanthes trifoliata*); marsh bedstraw (*Galium palustre*); marsh lousewort (*Pedicularis palustris*); white water-lily (*Nymphæa alba*); yellow water-lily (*Nuphar luteum*); and water crowfoot (*Ranunculus aquatilis*).

The undigested remains of food which have been found appear to prove that the Swiss lake-villages were inhabited during the whole year, and that they were not places of temporary resort, like those mentioned as still in use in North and South America.[1] Thus the cherry-stones indicate June; the seeds of raspberries and black-berries the middle and end of summer; the sloes and the seeds of the dog-rose the latter part of autumn; and the hazel nuts and beech nuts refer to the autumn and winter. The presence of remains of the swan, which bird only appears in the Swiss lakes in very cold winters, in the months of December and January, proves that the lake-dwellings were not abandoned even in the most severe winter weather.

"Spindle-whorls" of clay are shown, as well as pieces of hæmatite, supposed to have been used for paint. Portions of fishing-nets, and of woven and plaited cloths are in the collection.

STONE IMPLEMENTS FOUND IN ITALY.

Cases A 34 and B. 29.

Some waste flakes and rude flint implements from a drift deposit

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be obtained. These substances will smoulder, but not burst into flame; they are therefore wrapt in cedar bark, which has been pulled by hand to separate the fibres, in which state it readily ignites.

[1] Ante, p. 174.

at Ponte Molle, about two miles from Rome; and a stemmed flint arrow-head, found at Cervetri, the ancient Cære, near Rome, are shown; as well as a series of casts of stone implements, the originals of which were found in Nice, Piedmont, Tanaro, Ceresara, Laveno, Lake Como, Calindasco, Torée, and Ascoli, and are now preserved in the Museum of Milan and Lugano.

PILE-DWELLINGS OF LAKE VARESE, LOMBARDY.

Remains of five pile-villages were discovered by the Abate Professor Antonio Stoppani, in 1863, in Lake Varese; a sixth was subsequently found by the Abate Giovanni Ranchet. A *few* bronze objects, consisting of a pin, some fish-hooks, and two spear-heads, were obtained from the settlement of Bodio.[1]

Captain Angelo Angellucci has also given an account of his examination of some pile-villages in Lake Varese, in November and December, 1863. He only met with two forms of flint arrow-heads, a leaf-shaped type, and a finely worked barbed type with the stem and barbs unusually pointed; examples of both types are shown in the collection. The arrow-heads appear to have been made upon the spot, for unfinished and rejected specimens are abundant.[2]

The objects found in the pile-villages of Lake Varese are represented in the collection by a series of casts and wax models, and by some original specimens presented by Mr. J. W. Flower. The originals from which the casts were taken are preserved in the museum at Milan.[3]

STONE IMPLEMENTS FOUND IN BELGIUM.

Cases A 34 and A 35.

The worked flints exhibited in these cases formed part of the

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[1] Stoppanni "Rapporto sulle Ricerche nel Lago di Varèse," 1863; Keller, *l.c.*, p. 217; "Matériaux," *l.c.*, vol. i., p. 456; Gastaldi, "Lake Habitations of Northern and Central Italy," pp. 122—124. See also a summary of the discovery of lake-dwellings in Italy in "Flint Chips," *l.c.*, pp. 125—127.

[2] "Le armi de pietra donate da Sua Maestà il Re Vittorio Emmanuele II., al Museo Nazionale d'Artiglieria," Turin, 1865. "Matériaux," *l.c.*, vol. ii., pp. 86, 90.

[3] For a detailed account of the pile-settlements in Lake Varese see Marinoni, "Le abitazioni lacustri e gli avanzi di umana industria in Lombardia," Milan, 1868, published by the "Societa Italiana di Scienze Naturali," vol. iv., No. 3.

Toilliez Collection, and were found, together with many similar specimens, on the rising ground to the south-east of Mons, between Spiennes, Nouvelles, and Harmignies; they are most abundant on the lands to the south and south-west of Spiennes.[1] M. Désiré Toilliez announced the discovery of implements near Spiennes to the Academy of Sciences of Belgium in 1847.[2] After the death of M. Toilliez, in 1865, his pre-historic collection passed into the hands of Mr. John Evans, who has presented specimens of the Spiennes implements to several public collections, including the Blackmore Museum. In 1866, M. C. Malaise attempted to assign these objects to the Quaternary period, and M. Le Hon, in "L'Homme fossile," fell into the same error. Mr. Evans and the late M. Toilliez shared the idea that a manufactory of flint implements had existed near Spiennes, and that the specimens found there are the rejected implements and waste pieces. In this opinion MM. Gabriel de Mortillet, Cornet, A. Briart, and d'Omalius coincide.[3]

Flint implements, bearing a considerable resemblance to the Spiennes specimens, have been found in some pits in Cissbury Camp, near Worthing, Sussex. The discovery was made by Col. A. Lane Fox, in September, 1867.[4] In all about 600 specimens were found, only one of which was polished; no metal implements were found associated with them. The Rev. Canon Greenwell obtained a large number of flint implements from the Cissbury pits, in 1868, among which were two boring tools.

GERMANY.

Case A 34.

Some stone hatchets, found near Quedlinburg, and at Thale near

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[1] C. Malaise, "Bull. Acad. de Belgique," 5th Jan., 1866, ser. 2, vol. xxi., pp. 4—11. "Matériaux," *l.c.*, vol. ii., pp. 428—430.

[2] "Bull. Ac. R. Belgique," 1847, 1848, 1849, 1851.

[3] F. L. Cornet and A. Briart, "Bull, Ac. R. Belgique," 1st Feb., 1868, pp. 126—138; d'Omalius, 1st Feb., 1868, pp. 73—79. A. Briart, F. Cornet, and A. Houzeau de Lehaie, "Rapport sur les découvertes géologiques et archéologiques faites à Spiennes en 1867." Mons, 1868. "Matériaux," *l.c.*, vol. ii., pp. 428—430, vol. iv., pp. 119—121.

[4] A. H. Lane Fox, "Examination of the Hill Forts of Sussex, with an account of excavations at Cissbury and Highdown." "Archæologia," vol. xlii., 1869.

Aschersleben, both in Prussia, are shown. These formed part of the Klemm Collection, and were presented by Mr. Augustus W. Franks. A stone chisel and a stone hatchet from Pesth, Hungary, were presented by Mr. J. W. Flower.

SHELL-MOUNDS OF DENMARK.

Shell-mounds, or Kjökkenmöddings,[1] are heaps of shells, mixed with broken bones and othes refuse, which have accumulated around the sites of ancient dwellings. At Havelse, the mound is in the form of an irregular ring: the central space was probably the site of the hut, or huts. At one time the Danish shell-mounds were thought to be natural deposits—in fact, "raised beaches;" but this was proved not to be the case, for the shells in them belong entirely to full-grown, or to nearly full-grown, individuals, and consist of four species which do not live together, and do not require the same conditions. The Danish shell-mounds are frequently of great extent, being more than 300 yards long, 10 feet thick, and from 100 to 200 feet broad.

The people who resorted to these spots, to feed upon the shell-fish found close at hand, were probably of migratory habits. Remains of the wild goose are found in the shell-mounds. As this bird is only a winter visitor, it would seem that the shell-mounds were sometimes occupied even in cold and inclement weather. No trace of grain has been met with in the Danish shell-mounds. Bones of the sheep, horse, reindeer, and domestic fowl are absent. Polished stone implements themselves have not been met with in the shell-mounds, but Mr. Evans and Professor Steenstrup have found pieces of polished stone hatchets, some of which had been worked up into tools and scrapers.[2]

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[1] The name "Kjökkenmödding" is derived from *kjökken* (kitchen) and *mödding*, corresponding to our local word midden or midding, a "refuse heap." Lubbock, "Prehistoric Times," 2nd edition, p. 217. The carrion crow, in some districts, is known as the *midden-crow*. T. Wright, "Dict. Obsolete and Provincial English," p. 672.

[2] For an account of the Danish shell-mounds see "Pre-historic Times," 2nd edition, pp. 216—241.

Shell-mounds, resembling the Kjökkenmöddings of Denmark, have been observed in many parts of the world; indeed, they are still being formed by the Fuegians, and some other savages. The Fuegians, who live chiefly upon shell-fish, constantly change their place of residence, to which they return at intervals, adding at each visit to the piles of old shells, which often amount to many tons in weight.[1] From the uncleanly habits of savages, a frequent change of residence is necessary on the ground of health. Shell-mounds, in particular, appear to have contained the whole refuse of the settlement, which was thrown out, as it is by the Ahts of the north-west coast of America at the present day, whose camp is described as being surrounded with putrid fish and castaway molluscs,[2] which the elements and the birds clear away during the time that the site remains unoccupied.[3]

Some shell-mounds were examined by Mr. Charles Rau, of New York, in 1863-4, at Keyport, Monmouth County, New Jersey, U.S.A. The most abundant shells in them were those of the oyster and the clam; shells of periwinkle, however, were present. Mingled with the shells were broken animal bones, many fragments of pottery, and numerous stone implements, which last are very scarce in this part of New Jersey, except in the shell-mounds. The appearance of these mounds is described as being like that of a snow-covered field, from the great number of bleached shells of which they are formed.[4] One mound extends over an area of six or seven acres, and in parts the deposit is from five to eight feet in thickness. Mr. Rau collected more than three hundred specimens in this shell-mound and in the immediate neighbourhood, consisting of grooved stone-axes, flint flakes, flint arrow and spear-heads, and pottery. A large number of waste flakes and unfinished arrow-heads were found, tending to show that the implements had been made upon the spot. The last Indians who periodically came to this neighbourhood belonged to the tribe of Narragansets. They visited the spot every year, in order to catch shell-fish for winter use.[1]

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[1] Darwin's "Journal," p. 234.

[2] Sproat, "Scenes and Studies of Savage Life," p. 42.

[3] Sproat, *l.c.*, p. 38.

[4] Darwin remarks of the shell-mounds in Tierra del Fuego—"These heaps can be distinguished at a long distance by the bright green colour of certain plants which invariably grow on them." "Journal," vol. i., p. 272.

The farmers in Long Island burn the shells obtained from these mounds for lime. Two centuries and a quarter ago the Dutch colonists of Manhattan Island made the same use of the shell-mounds which had been formed by the Indians there. In the account of New Netherland, given by the Jesuit missionary, Isaac Jogues, is the following passage:—"Lime they make of oyster shells, great heaps of which are found here, made formerly by the savages, who subsist in part by that fishery."[2]

Sir Charles Lyell has described a shell-mound on St. Simon's Island, near the mouth of the Altamaha River, in Georgia, which covered ten acres of ground, and had a depth of from five to ten feet.[3]

Shell-mounds exist on the shores of every state, from Connecticut southward along the Atlantic and Gulf of Mexico. Some of them are of enormous extent, covering several acres of ground.

In Florida there are very many shell-mounds. At Fernandina, a new town on Amelia Island, a layer of shells exists along the face of the bluff for 150 yards, extending inland for a quarter of a mile; in parts the deposit is three feet in thickness, composed almost wholly of oyster shells, with a few shells of clams and conches. Similar deposits are found in various parts of the island, and on the opposite mainland. They occur on both sides of the entrance to the St. John's river, and on Anastasia Island. One of the most remarkable is Turtle Mound, on Mosquito Lagoon, near New Smyrna. It is thirty feet in thickness, and is composed almost entirely of oyster shells, with a few shells of conch and clam. Another very similar shell-mound exists opposite New Smyrna. A shell-mound on Crystal River, on the Gulf coast, four miles from its mouth, is about forty feet in thickness, the surface being nearly level. It is thirty feet in breadth.[1]

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[1] The natives of the north-west part of America catch and dry mussels for winter use. Lord, "Naturalist in Brit. Columbia."

[2] "Memoir of a Captivity among the Mohawk Indians, a Description of New Netherland in 1642—43, by Father Isaac Jogues. Republished by John Gilmary Shea, New York, 1857, p. 57.

[3] "Second Visit to the United States," vol. i., p. 252.

A description of some "Fresh-water Shell-Mounds," which exist on the banks of the St. John's river, East Florida, has been published by Dr. Wyman, who examined them in February and March, 1867, in company with Mr. G. A. Peabody and Mr. George H. Dunscombe.[2] These heaps of shells are distributed over an area of more than 150 miles, between Palatka and Salt Lake, and are nearly all situated on knolls. They are composed almost exclusively of shells of *Ampullaria depressa, Paludina multilineata,* and *Unio Buckleyi.* In size the mounds vary from circular heaps, fifteen to twenty feet in diameter, to long ridges several hundred feet in length, and from four to five, or even in some cases fifteen feet in thickness. The shell-mound at King Philip's Town is about 450 feet in length, and from 100 to 120 feet in breadth. Its greatest thickness is about eight feet. Fragments of pottery and broken animal bones abound in it. One of the largest shell-mounds on the St. John's is at Black Hammock; it is about 900 feet in length, and varies in breadth from 100 to 150 feet. The shells in this mound are chiefly *Paludinæ,* although *Unies* and *Ampullariæ* are met with. Pottery and broken bones are also abundant in this mound. Other similar shell-mounds have been examined at Old Enterprise, on the north-eastern shore of Lake Monroe; and at Horse Landing, on the St. John's, from which last deposit Mr. Peabody obtained a rude arrow-head of flint, a material not found *in situ* in this part of Florida.

Although the shell-mounds of the St. John's river consist of fresh-water shells, objects made from marine shells are occasionally met with in them; the shells which have been so used are chiefly *Strombus gigas, Pyrula carica,* and *P. perversa.* Chisels, gouges, and hatchets made of such shells have been found. No smoking-pipes, or fragments of pipes, have been found; stone objects, indeed, appear to be rare in these American fresh-water shell-mounds. But one stone chisel, and about twenty-five stone arrow and spear-heads appear to have been collected by Dr. Wyman, and these were chiefly met with in the vicinity of the shell-mounds, not in the mounds themselves.

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[1] Daniel G. Brinton, "Notes on the Floridian Peninsula."

[2] "American Naturalist," vol. ii. Nos. 8 and 9.

The mounds of oyster-shells on the sea-coast of Florida have been described by Dr. Brinton,[1] who also observed mounds of mussel-shells, while he was connected with the army of the Cumberland in the war of the rebellion.[2] Count Pourtalès visited some shell-mounds at Old Enterprise, Lake Monroe, in 1858. Mounds of mussel-shells, containing objects of human workmanship, have been noticed on the banks of the Muskinguru River.[3] Dr. Wyman, Mr. Emerson, Mr. Elliot Cabot, and others, have examined some shell-mounds on the banks of Concord River, in Massachusetts, consisting of *Unio complanatus*, and containing charcoal, worked flint and bone.[4] Dr. Joseph Leidy has described some shell-mounds which exist at Cape Henlopen.[5] Professor Whitney and Dr. William H. Brewer have noticed vast numbers of fresh-water shell-mounds in California. Indeed, they appear to be widely scattered throughout the United States.

Shell-mounds exist in Newfoundland, and Sir Robert Schomburgk has examined numerous heaps of couch shells *(Strombus gigas)* which occur on the eastern point of the island of St. Domingo. "These shells have, invariably, a hole near the spire, which was made for the purpose of detaching the animal from the shell, and so as to extract it with ease."[6]

Mr. G. Windser Earl has examined some shell-mounds in the province of Wellesley, in the Malay Peninsula.[7] Lime was made by burning the shells found in these mounds. One mound of cockle-shells is described as dome-shaped, about eighteen feet high, and nearly 200 paces in circumference at its base. No other shells than those of *full-grown* cockles were found, either in this mound, or in the other mounds subsequently examined by Mr. Earl.[1]

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[1] "Notes on the Floridian Peninsula," p. 166.

[2] "Smithsonian Reports," 1866, p. 356.

[3] "Archæologia Americana," vol. i. p. 226.

[4] "Proceedings Boston Society of Nat. Hist.," vol. xi., p. 243.

[5] "Proceedings Acad. Nat. Sciences," 1866.

[6] "Ethnological Researches in Santo Domingo," in the Report of the British Association, July, 1851, pp. 90—92.

[7] "Trans. Ethnol. Soc." London, 1863, vol. ii., pp. 119—129, New Series.

Dr. Stoliczka, in a communication to the Asiatic Society of Bengal, gives an account of his visit to the Andaman Islands, and of some shell-mounds which he there examined. At the north of Chatham Island, behind a mangrove swamp, and on the bank of a small stream, he saw a mound twelve feet in height, and about sixty feet in diameter, composed of shells, intermixed with large numbers of bones of the Andaman pig, stones, and broken pottery. It had been long undisturbed for some large trees were growing upon it. The prevailing shells were *Trochus Niloticus, Pteroceras chiragra, P. lambis, Turbo articulatus, Murex adustus, M. anguliferus,* and *Neritæ.* An *Ostrea* was also found, of quite an ancient type, very closely allied to the jurassic *O. Marshii,* or *flabelloïdes*; and which still exists on the Nicobars.

Between the shells of the mound and those of the molluscs now living around the islands, there is no difference in size. Most of the shells have been broken to facilitate extraction of the interior; and however troublesome they may have been to open, the Andamanese appear to have selected the kinds which contained the greatest amount of eatable substance. The long bones of the pigs were all found split and broken in the usual manner for the extraction of marrow.

The pottery is thin, with a roughly grooved surface. The material is an ordinary clay mixed with a small quantity of sand; the vessels are rudely moulded and are said to be sun-dried. The pottery closely resembles that made by the natives at the present time.

Besides shells bones and potsherds, stone-implements are met with in the Andaman shell-mounds. Many of these have been used as hammers for breaking the shells and bones; a few polished stone hatchets, and a typical arrow-head, however, have been found. The shell-mounds are numerous on the islands, occurring in suitable localities near the sea-shore, where a supply of fresh-water is accessible, and a coral reef as a hunting-ground for shell-fish is not far off. Some of the mounds, are still in process of increase; for the natives return after a time to the same locality, and generally stay as long as the supply of shells and jungle fruits last.

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[1] Living shells of the same species still exist in the neighbourhood, but in very small quantities; they are used as food by the Malays.

So far as the mounds have yet been examined they afford no evidence to support the statements which impute cannabalism to the Andamanese.[1] A shell-mound on Viper Island was levelled by the Public Works Department so lately as in 1861.

Shell-mounds have been examined in Australia[2] and Tasmania. Dr. Milligan, in describing the shell-mounds left by the natives on the shores of Tasmania and the adjacent islands, says that in places where the shells are univalves, round stones of different sizes are met with; one, the larger, on which the shells were broken; the other, and smaller, having served as the hammer with which to break them. But when the shell-mound consists of oysters, mussels, cockles, and other bivalves, then flint knives, used in opening them,[3] are generally found.[4]

Shell-mounds have been observed by Dr. Gordon, of Birnie, on the shores of the Moray Frith; and by Mr. Laidlay on a peninsula near Seacliff, Haddingtonshire, three miles east of North Berwick, on the south side of the Frith of Forth.[5] A very large shell-mound exists at a place called Brigzes, on Loch Spynie. Mr. Roberts has described some shell-mounds at Bennet Hill, near Burghead,[6] and Mr. Laing has given an interesting account of several shell-mounds examined by him in Caithness. The deposit in the "Churchyard" shell-mound mound was at least five feet in thickness, and it covered an area of several hundred square yards. In this deposit, chiefly towards the middle and base of it, chipped flints and rude implements of stone and bone were found, as well as fragments of coarse pottery.[1] In the "Harbour" shell-mound the deposits appear to have been made at different periods; the shells were chiefly those of limpets. The "Churchyard" shell-mound was composed mainly of periwinkle shells.[2]

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[1] "Athenæum," May 14th, 1870.

[2] Pinkerton, "Travels," vol. ii., p. 473.

[3] "Trans. Ethnol. Soc." 1863, vol. ii., p. 128.

[4] We need not, however, in all cases expect to find implements for opening the molluscs in the shell-mounds, inasmuch as without doubt they were often opened by other means. The Indian women on the Columbia, who dig clams for food, hollow out a ring in the ground, about eight inches in depth, which they fill with large pebbles, made hot in the camp fire; upon these the clams are laid; the heat speedily causes them to open; the clam is then extracted with a pointed stick; it is strung with others on a cord, smoked and eaten. Lord, "Naturalist in British Columbia," vol. i., pp. 186—190. The New Zealanders open mussels in a similar manner: when smoked they are said to taste like old cheese, and to keep for years. Library of Entertaining Knowledge, "New Zealanders," p. 212.

[5] "Geological Magazine," vol. vii., No. 6, June 1st, 1870, pp. 270, 271.

[6] "Anthropological Review," Feb., 1864.

Although fish abound upon the coast, yet fish-bones are not abundant in the Caithness shell-mounds; while they are, according to Sir John Lubbock,[3] "almost innumerable" in the Danish kjökkenmöddings. Bones of the Great Auk *(Alca impennis)* occur in the Caithness shell-mounds as well as in the shell-mounds of Denmark. The Great Auk is now extinct in Europe, having but lately died out in Iceland; it is said still to survive in Greenland.[4]

The shell-mounds in Orkney resemble those in Caithness. In each case periwinkle and limpet shells constitute the great mass of the midden, with the addition of cockle and oyster shells in some of the sheltered bays where these molluscs are now found. Fishbones are more abundant in some of the Orkney than in the Caithness shell-mounds.[5]

Some shell-mounds in Cornwall and Devonshire have been described by Mr. Pengelly and Mr. Spence Bate.

Sir John Lubbock, Mr. Evans, and Mr. Prestwich found a shell-mound at St. Valéry, close to the mouth of the Somme, France.[6]

Mr. J. Wickham Flower found an extensive kjökkenmödding in the island of Herm. The shells and broken bones were here intermingled with hand-made bricks, querns, tiles, fragments of iron, bronze, and glass, several pieces of Samian ware, and polished stone implements of a peculiar form.[1] Some of these specimens may be seen in the collection, they were presented by Mr. Flower.

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[1] "Pre-historic Remains of Caithness," pp. 20—22.

[2] Ibid, pp. 22—30.

[3] "Pre-historic Times," 2nd edition, p. 225. The most common species in the Danish shell-mounds are *Clupea harengus* (herring), *Gadus callarius* (dorse), *Pleuronectes limanda* (dab), and *Muræna anguilla* (eel). Mr. John Evans does not consider that fish remains are *very* abundant in the Danish shell-mounds.

[4] "Pre-historic remains of Caithness," p. 50.

[5] Ibid, pp. 58, 59.

[6] "Pre-historic Times," 2nd edition, p. 222.

FLINT FLAKES AND IMPLEMENTS FOUND IN THE SHELL-MOUNDS OF DENMARK.

Cases C 23 and C 24.

Many of the specimens shown were found in a shell-mound at Meilgaard by Mr. John Evans, by whom they were presented to the collection.

Meilgaard is one of the largest and most interesting of the Danish shell-mounds; it is situated in a beautiful beech forest, called "Aigt," or "Aglskov," on the property of M. Olsen, not far from the sea-coast, near Grenaa, in north-east Jutland. The mound is about ten feet in thickness in the middle, from which, however, it slopes away in all directions; around the principal mound are several smaller mounds of the same nature. Over the shells a thin layer of mould has accumulated on which the trees grow. The *entire* thickness of the mound consists of shells; oysters being, at Meilgaard, by far the most numerous, with here and there a few bones, and still more rarely stone implements, or fragments of pottery. Excepting just at the top and bottom, the mass is quite unmixed with sand and gravel; and, in fact, contains *nothing* but what has been, in some way or other, subservient to the use of man.[2] A photograph, one third of the natural size, taken from a block obtained from the shell-mound at Meilgaard, is shown. The original block is preserved in the Royal Museum of Northern Antiquities at Copenhagen. In this block shells of the cockle are rather numerous.

Some of the small triangular "axes" which are very characteristic of the "coast-finds" and "shell-mounds" are shown. These implements are flat on one side, and more or less convex on the other; rudely triangular or quadrangular in shape, with the cutting edge at the broader end, and from 2½ inches to 5½ inches in length, with a breadth of 1½ inches to 2½ inches. They are never ground, and the cutting edge, although not sharp, is very strong, as it is formed by a plane, meeting the flat side at a very obtuse angle. Professor Steenstrup doubts whether these curious and peculiar implements were ever intended for axes; he regards them as having been used as "sinkers," and figures somewhat similar objects which are applied to this purpose by the Esquimaux. The so-called edge, in his opinion, neither has, nor could have, been used for cutting. Sir John Lubbock rather inclines to the belief that they really are "axes," and he figures a kjökkenmödding axe and a special form of New Zealand adze, side by side, in support of his opinion.[1]

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[1] "Journ. Anthropological Soc.," July, 1869.

[2] "Pre-historic Times," 2nd edition, pp. 219, 220.

Nilsson figures one of these implements and describes it, provisionally, as an "ice-chisel."[2]

"COAST FINDS" OF DENMARK.

Case C 24.

In this case are some flint flakes and implements from a "Coast-find" at Korsör, found by Mr. Evans, and presented by him to the collection.

"Coast-finds" are discoveries of rude flint implements, which are found lying in large numbers on certain spots along the old line of coast. They are called "Kystfunden" by the Danish antiquaries. Owing, probably to the elevation of the land which has taken place in Jutland since the Stone period, some of these "coast-finds" are now on dry ground, and as the shore is very flat, the elevation, slight as it is, has in come cases been sufficient to separate them by a considerable distance from the present water-line. Some, on the other hand, are at lower levels; one, for instance, close to the Railway Station at Korsör, is exposed only at low tide, and others are always covered. The coast-finds probably belong to different classes. Thus, one at Anholt was evidently a workshop of flint implements, as is shown by the character of the chips, and by the discovery of more than sixty flint cores. Those, on the contrary, which even at the present day are under water, must have been so in old times, and, as there are no traces of lake-dwellings in Denmark, Sir John Lubbock has suggested that they indicate the places where the fishermen used to drag their nets. It is still usual to choose particular spots for this purpose, and it is evident that many of the rude objects used in fishing, especially the stones employed as net-weights, would there be lost. The objects discovered are what might have been expected under these circumstances. They consist of irregular flint chippings, net-sinkers, slingstones, flakes, scrapers, awls, and axes. Sir John Lubbock and Professor Steenstrup, in about an hour's search, found at Froëlund, near Korsör, 141 flakes, 84 net-weights, 5 axes, 1 scraper, and about 150 flint chips. At a similar spot near Aarhuus in Jutland, Sir John Lubbock picked up in two hours and a half, 76 net-weights, 40 flakes, 39 scrapers, 17 awls, and a considerable number of flint chips. In the sheltered and shallow fjords of Denmark, the sea is generally calm, and, in many instances, a layer of sand has accumulated over and thus protected the flint fragments. This was the case with both the above-mentioned coast-finds, one of which was exposed in draining the land, the other in making a railway cutting. Of course, in a sea like that which surrounds our coast, such remains would soon be reduced to mere gravel; besides which, we must remember that on our southern and eastern shores the sea has encroached greatly, even in historical times. Mr. John Evans suggests that some of the coast-finds may be due to shell-mounds having been destroyed by inroads of the sea.

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[1] "Pre-historic Times," 2nd edition, figs. 108—113, pp. 92—94, 240.

[2] "Stone Age of Scandinavia," plate vi., fig. 141, p. lxxvi.

"Flint-finds," resembling in many respects these Danish coast-finds, are not altogether unknown in Britain. A great number of flint flakes, with a few arrows and cores, were found some years ago by Mr. Shelley in a field near Reigate. Mr. T. F. Jamieson mentions a spot on the banks of the Ythan below Ellon, where in a few minutes he filled his "pockets with flint flakes, abortive arrow-heads, flint blocks from which the flakes have been struck off, and other such nondescript articles of ancient cutlery."[1] There are other places, as, for instance, Bridlington; Cissbury Camp, near Worthing; Pontlevoy; Spiennes, near Mons;[2] and Pressigny le Grand,[3] where numbers of rude hatchets, cores, flakes, spear-heads,

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[1] "Aberdeen Journal," October, 1863.

[2] See Ante, pp. 203, 204.

[3] See Ante, pp. 169, 170.

&c., have been found. Sir John Lubbock's remark, "now that our attention has been called to these flint-finds, no doubt many similar discoveries will be made elsewhere,"[1] is being verified almost daily. Nor are these discoveries confined to Europe. Mr. Busk and Mr. Langham Dale have met with a very similar assemblage of flakes, &c., on the Cape Flats, at the Cape of Good Hope, and the discoveries made by the late Lieut. Swiney, at Jubbulpore, Central India,[2] appear to be of this nature.

But it is not necessary to look beyond the neighbourhood of Salisbury for examples of flint-finds. Mr. Joseph Stevens of St. Mary Bourne, has described a flint-find which exists at Breachfield, about a quarter of a mile north-east of St. Mary Bourne, near Andover;[3] whilst close to Salisbury there are many flint-finds; they occur at Petersfinger and Ashley Hill, both on the south-eastern side of Salisbury, as well as on the rising ground near the gravel-pit above Bemerton, and elsewhere. Many of these flint-finds probably indicate the site of a temporary settlement. Flint-finds usually extend over a comparatively small area; the flakes and implements become more and more scarce as you walk away from a central space, at which they are usually abundant, and which, probably, marks the site of the hut or huts.

FLINT AND STONE IMPLEMENTS FOUND IN SCANDINAVIA.

Cases A 36 to A 39, C 22 to C 27.

The immense number of stone implements found in Scandinavia has often been mentioned; but, among them all, no flint implements of palæolithic types have as yet been found. The typical Scandinavian flint hatchet has straight sides,[4] flint hatchets with oval sections are, however, found in Scandinavia[1] although they are not at all abundant; specimens with this oval section are in Mr. Evans's splendid collection, at Nash Mills. In both the Nash Mills and the Christy Collections are some rudely chipped flint implements, found in Denmark; these are possibly in an unfinished state, but of course, were never intended to be made into hatchets with straight sides; they are not unlike the flint implements found at Spiennes.[2]

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[1] "Pre-historic Times," 2nd edition, pp. 101—103,

[2] "Proceedings Asiatic Soc. of Bengal," Feb., 1869, pp. 52, 53. "Flint Chips," *l.c.*, pp. 108, 109.

[3] "A Descriptive List of Flint Implements found at St. Mary Bourne." London, Tennant, 1867.

[4] Nilsson, *l.c.*, plate vii., fig. 157, 158, both from Scania, Sweden. "Pre-historic Times," 2nd edition, plate i., fig. 1, p. 90, figs. 101, 102. Worsaae, "Nordiske Oldsager," figs. 6, 8, 11, 12. Lindenschmit, "Die Alterhümer unserer heidnischen Vorzeit," heft ii., taf. 1, n. 14.

Three tolerably distinct types of Scandinavian hatchets may be noticed in the collection.

(*a*). Hatchets rather thick, and of nearly equal breadth throughout the length of the blade.

(*b*). Hatchets tapering in width towards the butt end, and much thicker than *a*. Some examples of this type curve outward at each side of the cutting edge.

(*c*). Hatchets resembling *b* in form, but much thinner and usually more highly polished than either *a* or *b*.

Several flint chisels and gouges are shown. Flint gouges, although common in the North of Europe, are rarely found in Great Britain or Ireland. Stone gouges are comparatively abundant in North America. In the Nash Mills Collection there are three flint gouges with a pointed oval section, found in Denmark: the same number of this rare type of gouge are preserved in the Christy Museum. Gouges of this type have been figured.[3]

Among the whet-stones shown are some of a pointed oval form, which do not belong to the Stone age. Not less than a hundred similar objects were found in the peat-mosses at Thorsbjerg, and Nydam in South Jutland, associated with objects of the Early Iron Period. It has been suggested that the groove which is worked around them served for the reception of a cord by which they were carried hanging from the girdle.[4] Nilsson classes them as hammer-stones; he considers that the edges of stone tools have been struck against the grooved sides of these implements, in order to sharpen them.[1]

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[1] Nilsson, *l.c.*, plate vi., fig. 145, plate vii., figs. 151, 152. Worsaae, "Nordiske Oldsager," fig. 9.

[2] See Ante, pp. 203, 204.

[3] Nilsson, *l.c.*, plate vi., fig. 139. Worsaae, "Nordiske Oldsager," fig. 19.

[4] Engelhardt, "Denmark in the Early Iron Age," p. 59, plate xii., fig. 12; plate xiii., figs. 65—69. See Ante, pp. 164, 165.

Some of the perforated stone axes in the collection illustrate the method of drilling these objects. Several flint arrow and spear-heads, and semi-lunar flint scrapers are shown. The scrapers, in some instances, are polished at the straight edge from the friction of some soft substance, such friction as would arise from pulling the skin of an animal backwards and forwards over the edge; this polishing does not extend over the whole surface of the implements, but only to about three-fourths of an inch from the straight edge; the curved part of the flint was perhaps inserted in a block of wood, and would thus be guarded from friction. They were probably used for softening skins in the way already suggested.[2]

Some of the flint knives and daggers in the collection show the skill to which the ancient inhabitants of Scandinavia had attained in chipping such a brittle material as flint.

Flint daggers are of two types:—(*a*) the broad, leaf-shaped variety; and (*b*) those having raised ridges at the handle. These last do not appear to have been found in Great Britain, although they are not uncommon in the North of Germany and Scandinavia.[3] Some flint knives have sharp edges at the sides for some distance from the point; towards the butt end these edges have been removed by grinding, apparently with the view of preventing the cutting of the string by which they were attached to the handle,[4] or perhaps to render them more comfortable for use in the hand.

It is strange that many of the flint daggers, although they must have cost much trouble in making, appear to have been, subsequently, exposed to very rough treatment. Some of them were used for hammering, perhaps, even for knapping flint. They were held by the blade, and the blows were struck by the side ridges of the handle. In some specimens the "crimped" work has been completely broken away from this mis-use of the weapon.

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[1] Nilsson, *l.c.*, pp. 13—15, plate i., figs. 7, 8, and 10.

[2] Ante, p. 149.

[3] "Horæ Ferales," p. 135.

[4] Ante, Part i., p. 14.

Before noticing the extensive series of stone implements from America in the collection, it may be well to mention that some specimens, although few by comparison, are shown from Egypt, Arabia, the East Indies, and Africa.

EGYPT.

Case D 14.

A fac-simile of a very interesting hatchet of nephrite is shown. The original was brought from Egypt by the late Col. Milner, in 1812, and is now preserved in the Christy Museum. Each of its faces is engraved with a Gnostic formula in the debased Greek character current at Alexandria during the third and fourth centuries. One of these formulæ is in the fashion of a wreath composed of fourteen leaves, each of them engraved with Gnostic charms. This object is supposed to have been originally regarded as a *ceraunia*, (thunder-bolt stone) and was, no doubt, supposed to possess many valuable properties. This ancient amulet the Gnostics, probably at Alexandria, appear to have sought to endue with fresh mysterious powers by the formulæ engraved upon it.[1]

Mr. Evans has already alluded to the belief which prevailed among the ancients, and still exists in widely-separated countries, that stone hatchets and axes are thunder-bolts. On account of this supernatural origin, they were, and in some countries even now are, treasured as amulets.[2] The development of the "Myth of the thunder-bolt" belongs to a period when the nature of the buried stone implement was forgotten, and affords evidence that, in certain districts where implements of metal are in present use, former occupants of the soil must have employed implements of stone. It may not be uninteresting therefore to enquire into some of the superstitions connected with

"THE MYTH OF THE THUNDER-BOLT."

According to a popular belief which existed in the north of Europe the lightning is accompanied by a "thunder-stone," which penetrates into the earth as far as the tallest church steeple is high; but this stone rises towards the surface each time it thunders, and at the expiration of seven years again makes its appearance on the earth. Every house in which such a stone is preserved is secure from the effect of thunder-storms, on the approach of which it begins to sweat.[1] In Germany, the house in which a "thunder-stone" is kept is supposed to be protected from injury by lightning, and when a tempest is approaching the stone begins to sweat; it is also said of the "thunder-stone" that "he who chastely beareth this, shall not be struck by lightning, nor the house or town where that stone is."[2]

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[1] See Mr. King's Memoir on this relic. "Archæol. Journal," vol. xxv, pp. 103—116.

[2] Ante, part i., pp. 10, 11.

M. J. H. van Lennep mentions that a German haymaker once told him, "that he remembered having seen a *thunder-chisel* which always sweated when a thunder-storm was approaching."[3]

The negroes in Jamaica collect ancient stone hatchets, and use them to *keep water cool in their jars.* They suppose them to be thunder-stones, and think that they fall from the clouds during the heavy tropical storms to which the island is subject. They believe also that these thunder-stones rise to the surface of the ground once in seven years,[4] precisely as did the inhabitants of Scandinavia.

Mr. Heward obtained a stone hatchet from a negro woman in Jamaica, "who kept it in a porous water-jar; informing me that the fluid was much cooler in consequence of the *charm* of this peculiar shaped stone, and I had some difficulty in persuading her to give it to me She could not give any account as to how she became possessed of it: she had never remembered it being anywhere else except in the water-cooler."[5]

Lieut. Steel, of the Royal Artillery, informs us that when he was dining with a tea-planter (Mr. Wingrove) in Upper Assam, he was shown a stone hatchet, which at the time the baby was using as a play-thing. The native who picked it up told Mr. Wingrove that he believed it fell from the sky, and that whoever found it would shortly die. "He was anxious to part with it, and yet afraid; for he valued it highly, and thought it a most powerful talisman."[1] Ultimately he sold it to Mr. Wingrove for a little opium.

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[1] Thorpe, "Northern Mythology," vol. i., p. 54, *note*; vol. iii., p. 57.

[2] Grimm. D. M., pp. 164, 1170.

[3] "Notes and Queries," 2nd series, vol. viii., p. 93.

[4] Lieut. Alwin S. Bell, "Journ. Brit. Archæol. Association," Dec. 31st, 1868, pp. 403, 404.

[5] "Notes and Queries," 2nd series, vol. viii., p. 93.

Stone implements are found in Burma, which differ in type from those met with in other parts of the East Indies. They are usually of basalt or some schistose rock, quite unlike anything to be met with in the district where the implements themselves occur. They are supposed to be thunder-bolts, by the Burmese, and are believed to accompany the lightning. The popular idea is, that if a flash of lightning is seen to strike the earth, and an earthen *chattie*, or other vessel, is inverted over the spot, then, that in the course of a year or so, the thunder-stone will be found beneath it, having, during that time, worked its way back again to the surface by its own recoil. Such a thunder-stone is called *mo-gio*.

To the true *mo-gio* the Burmese attach great value, from the properties they believe it to possess; but before it is adopted as an amulet, it is subjected to many tests, as, no doubt from experience, they have discovered that many of these amulets which are in use, do *not* possess the characteristic powers of the true *mo-gio*, and consequently must be regarded as spurious. One test of authenticity is that, if wrapped in a cloth and fired at, no effect will be produced on either the cloth or its contents, however near it may be held to the gun. The true *mo-gio*, if worn on the person, is supposed to render the wearer invulnerable. Another test of a genuine *mo-gio* is to place it on a mat with a quantity of rice. Should it be a real thunder-stone, no birds, or other creatures, will venture near the rice. Again, another test is cutting a rain-bow in half; a feat quite within the power of anyone possessing the real *mo-gio*! If a plantain tree be cut down with a true *mo-gio*, the root dies, and does not, as is otherwise usually the case, send up a new shoot.

The true *mo-gio* guards the house in which it is kept from destruction by fire. Its medicinal properties too are believed to be very great, and a small chip reduced to powder, and swallowed, is considered to be an effectual cure for inflammation of the viscera, and of the liver.[1]

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[1] Sir John Lubbock in the "Athenæum," June 22nd, 1867, quoting Lieut. Steel's letter, April 25th, 1867.

A belief in the thunder-bolt origin of stone hatchets is as common in China as it is in other parts of the world. In the Chinese Encyclopædia of the Emperor Kang-hi, who began to reign in 1662, the following passage occurs:—"'*Lightning-stones.*'—The shape and substance of lightning-stones vary according to place. The wandering Mongols, whether of the coasts of the Eastern Sea, or the neighbourhood of the Sha-mo, use them in the manner of copper and steel. There are some of these stones which have the shape of a hatchet, others that of a knife, some are made like mallets. These lightning-stones are of different colours; there are blackish ones, others are greenish. A romance of the time of the Tang, says that there was at Yu-men-si a great Miao dedicated to the Thunder, and that the people of the country used to make offerings there of different things, to get some of these stones. This fable is ridiculous. The lightning-stones are metals, stones, pebbles, which the fire of the thunder has metamorphosed by splitting them suddenly and uniting, inseparably, different substances. There are some of these stones in which a kind of vitrification is distinctly to be observed."[2]

In Japan the natives call a stone hatchet a "thunder-bolt," *Rai-funo-seki*; or *Tengu-no-masakari*, "battle-axe of Tengu," Tengu being the guardian of heaven. The notion is also current that they are implements of the Evil Spirit, whose symbol is the fox, whence they are named "Fox-hatchets" or "Fox-planes."[3] Dr. Jannsen mentions that ancient stone hatchets are treated by the Japanese with religious veneration, and are treasured up in the chapels and

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[1] W. Theobald, Jun. "Notes on the Stone Implements of Burma," in "Proceedings Asiatic Soc. of Bengal," July, 1869.

[2] "Mémoires concernant l' Histoire, &c., des Chinois, par les Missionnaires de Pékin," Paris, 1776, vol. iv., p. 474; Klemm, C. G., vol. vi., p. 467. Tylor, "Early Hist. of Mankind," p. 208.

[3] Tylor, *l.c.*, p. 211. Dr. O. Mohnike in "Archives Soc. Northern Antiquaries."

Kami-halls as sacred reliques of some value.[1] Dr. O. Mohnike saw some stone hatchets thus preserved in various temples during the course of a journey which he made to Jedo.[2]

In Java, and the Malay peninsula, stone hatchets are regarded as thunder-bolts;[3] and according to Dr. Schwaner, they are most carefully preserved by the present inhabitants of Borneo in bags, woven of cane, and suspended in the recesses of their dwellings among their talismans and amulets.[4]

In parts of India, as in Japan, stone hatchets are often treasured in Temples, and are frequently adorned with red paint as *mahadeo*, or sacred.[5]

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[1] See also A. W. Franks, "On Stone Implements from Japan," in "Trans. International Congr. Pre-hist. Archæol.," Norwich, 1868, p. 260.

[2] Franks, *l.c.*, p. 262.

[3] Yates "Archæol. Journal," No. 42; Earl, "Papuans," pp. 175, 176; Tylor, *l.c.*, p. 212.

[4] "Archæol. Journal," vol. xi., p. 123. Although the terms "talisman" and "amulet" are usually confounded together, their proper meaning is entirely distinct. *Talisman* is no more than the corruption in the Arabian mouth of the Greek *ἀποτέλεσμα* the influence of a planet or zodiacal sign upon the person born under the same. Now the influence of every *degree* in each sign was typified by a fanciful figure or group, painted in the "Table of Myriogeneses," and thus, by a natural transition, in course of time the symbol itself usurped the name, *Apotelesma*, of the idea which at first it was only meant to portray. A *talisman* was therefore by its very nature a *sigil*, symbolical figure, whether engraved in stone or metal, or drawn upon parchment or paper. Talismans, in some instances, served both to procure love and to avert danger from its possessor. The latter purpose alone was the object of the *amulet*, a word probably derived from rustic Latinity, its root being *amolior*, "to do away with," or baffle. The, at first sight, so specious etymology from the Arabic *hamalet*, "suspended," is overthrown by Pliny's notice of its primary signification, which shows it to be a genuine old Latin term, and not imported by the Oriental magicians of imperial times. For he cites the word as the country-folks' name for the cyclamen, "which ought to be planted in every house, if it be indeed true that where it is grown poisonous drugs have no power to harm; on which account they call the flower *amuletum*." Afterwards the name of the flower came to be applied to other natural objects possessing the like virtue; for Pliny, speaking of amber, observes "infantibus alligari amuleti modo prodest." See Mr. King's paper upon "Talismans and Amulets," in "Archæol. Journal," vol. xxvi., pp. 25, 26.

[5] Le Mesurier, in "Journ. Asiatic Soc. of Bengal," 1861, No. 1, p. 81; Theobald "J. A. S. B," April, 1864.

Stone hatchets are regarded as thunderbolts by the modern Greeks, who call them ἀστροπελέκια,[1] and by the Brazilians, who call them *corísco*,[2] that is "lightning," "thunder-bolt."

Dr. Leemans says that the Indians of Guiana distinguish between stone hatchets and ancient stone discs, regarding the latter only as being thunder-stones (*dondersteenen*), and ascribing to them a great medicinal power.[3] "It is remarkable," he adds, "that as well in the East as in the West Indies, the same appellation and superstition are found to exist, which still are prevalent amongst our illiterate country folks. It is well known, that in Holland, the stone wedges are called *donderbeitels* (thunder-chisels), whilst in Java, they are named lightning-teeth (*bliksem-tanden*)."[4]

The inability of the world to understand the nature of stone implements is not more conspicuously shown in the myth of their being thunder-bolts, than in the sham science which has been brought to bear upon them in Europe.

It is instructive to see Adrianus Tollius struggling against the philosophers.[5] He gives drawings of some ordinary stone implements, and tells how the naturalists say that they are generated in the sky by a fulgureous exhalation conglobed in a cloud by the circumfixed humour, and are as it were baked hard by intense heat, and the weapon becomes pointed by the damp mixed with it flying from the dry part, and leaving the other end denser, but the exhalations press it so hard that it breaks out through the cloud, and makes thunder and lightning. But he says, if this be really the way in which they are generated, it is odd that they are not round, and that they have holes through them, and those holes not equal through, but widest at the ends. It is hardly to be believed, he thinks.

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[1] Dr. Finlay's letter, Athens, July 10th, 1867, in the "Athenæum."

[2] Latin, *coruscare*. See Pr. Max. v. Wied, "Reise nach Brasilien," Frankfort, 1820—1821, vol. ii., p. 35; Tylor, *l.c.*, p. 223.

[3] Sotacus, quoted by Pliny (xxxvii., 51) says that there are "two other kinds of the ceraunia, the black and the red, resembling axe-heads in shape. Of these, such as be black and *round* are sacred things; towns and fleets can be captured by their instrumentality. The latter are called *Bætyli*, whilst the oblong sort are the *Cerauniæ*. Some make out another kind, in mighty request in the practices of the magi, inasmuch as it is only to be found in places that have been struck by lightning."

[4] Dr. C. Leeman's Report of additions made to the collection in the Leyden Museum, in 1858. "Notes and Queries," 2nd series, vol. viii., p. 92.

[5] Boethius, "Gemmarum and Lapidum Historia," Adrianus Tollius; Leyden, 1649, p. 482. Tylor, *l.c.*, p. 224.

The supernatural origin of stone hatchets being once established, they would immediately be regarded as potent amulets; thus we find that the ram or goat, which acted as the "leader of the flock," carried an amulet of this kind, suspended around its neck by the shepherd, in order to ward off the baneful effect of the evil eye from the entire flock.

It is probable that the *victory-stones* mentioned as being worn by Scandinavian warriors, were ancient stone hatchets; clearly, however, they were worn, like them, as amulets.

In Didrik of Bern's Saga, chapter xxv., it is related that King Nidung gathered a large warlike host, with which he marched against his enemies. He was only one day's march distant from the hostile army, expecting to do battle on the following day, when he discovered that he had forgotten his *victory-stone*, which he had left at home. This stone was a heirloom in his family, having passed from father to son during many generations,[1] and it possessed the virtue of ensuring victory to him who carried it in the fight. The king, dreading to lose the battle if he had not his victory-stone about him, especially as his army was weaker in numerical force than his adversary's, promised the hand of his daughter, together with a third of his kingdom, to him who should bring him this valuable stone before the commencement of the battle. Valent, the armourer, rode back to fetch the stone; he gave it to the king, who thereupon attacked the enemy and won the battle.

In the ninety-sixth chapter of this Saga, there is a still more elucidative narrative concerning such a *victory-stone*. Ditlew, a youthful champion from Tumatorp, in Scania, encountered an old warrior, Sigurd by name, in single combat. Towards evening Sigurd became fatigued, and observed that he had left his victory-stone at home. He therefore invited Ditlew home with him to spend the night in his house, so that they might continue the fight on the following day. Here Ditlew made the acquaintance of Sigurd's daughter, Gunhild, and they forthwith fell in love with each other. Old Sigurd, as soon as he entered his house, *hung his victory-stone round his neck*; but having drunk deeply during the night, he fell into a heavy sleep. Gunhild then stole the stone from her father, and gave it to her sweetheart. When the combat was renewed on the following day, Sigurd received three wounds, whereupon he owned himself vanquished.

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[1] Among the Spokain Indians, and some of the tribes west of the Rocky Mountains, stone hatchets are handed down from father to son as cherished heirlooms. Jade *meris* are similarly regarded as heirlooms by the New Zealanders.

Perhaps ancient stone hatchets were at times deposited in tumuli to serve as amulets. For instance, in a tumulus in Flanders, opened by M. Joly, six ancient stone hatchets were found placed on end in a circle around the interment. The difference in the age of these specimens, as indicated by the *patina* upon them, seems to favor the supposition that they were collected from the surface and deposited in the tumulus as amulets.[1]

ARABIA.

Case D 14.

Some stone flakes and implements from the Wady Magarah, and the neighbourhood of Mount Sinai, are shown; some of these were obtained from the ancient turquoise mines of the district, which were worked by the Egyptians as early as the 5th dynasty. They were nearly all found by Corporal Goodwin, during the time that he was attached to the Sinai Expedition, in 1868, and were presented by him to the collection.

EAST INDIES.

Case D 14.

Some cores and flakes of agate, jasper, &c., from Jubbulpore, Central India, are shown; they were found by the late Lieutenant Swiney of the Bombay Engineers, and were presented to the collection by Sir Charles Lyell, Bart. These objects are, with few exceptions, found scattered over limited areas by themselves, and are not mixed up with the rough blocks of material similar to that of which they have been made. Agate beds are sometimes near, but, as a rule, none of the flakes are found in the rough beds, and but few of the rough agates are intermingled with the chipped stones.[1] The places at which the flakes occur are probably to be regarded as the sites of manufacture, and may be classed with the "flint-finds" of Europe.[2]

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[1] "Proceedings International Congr. Prehist. Archæol," Paris, 1868, p. 119.

Some cores from the Indus valley, Scinde, are shown; they were found by Captain John Le Mesurier, and were presented to the collection by the Bedfordshire Archæological Society. The material probably partakes of the nature of a quartzite, and is not true flint. These specimens are said to have been found four feet beneath the surface of the bed of the river Indus, in a deposit of gravel about two feet in thickness.[3]

AFRICA.

Case D 15.

A series of flakes and implements of quartzite, found in the neighbourhood of the Cape of Good Hope, are shown.[4]

Some of the specimens were found by Mr. C. J. Busk, and Dr. Langham Dale, on those portions of the great flat between Table Bay and False Bay, which lie on the north side of the main road, about two miles from the shore of Table Bay. This series was presented to the collection by Mr. George Busk. Others, found in the neighbourhood of Graham's Town, were presented by Sir Charles Lyell, Bart.; and a third series, found near Kleinomond, was presented by Mr. Evans. Some casts of stone hatchets from Djelfa, Algeria, are also shown.

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[1] Col. R. E. Oakes, "Proceedings Asiatic Soc. of Bengal," Feb. 1869, pp. 51—53.

[2] Ante, pp. 215, 216. See Blanford, "P. A. S. B.," 1867, pp. 142, 143; Carnac, "P. A. S. B.," 1865, p. 77; Blanford, "P. A. S. B.," 1866, p. 230; Evans, "Proceedings Soc. Antiq.," second series, iii, 39.

[3] Evans, "Geological Mag," Oct. 1866, pp. 433, 434; Gen. Twemlow, "Geological Mag," January, 1867, pp. 43, 44.

[4] See "Trans. International Congr. Prehist. Archæol," Norwich, 1868, pp. 69—79.

It is but a few years since that Africa was considered an exceptional country as regards the use of stone implements. Prichard said that the first inhabitants of Africa must have had knowledge of iron, because there was no trace of the Stone age there. This, however, is proved to be an error, not only by the discovery of the implements themselves, but from the accounts given us by travellers. For instance,[1] on the West African coast, north of the Cape, there were pastoral tribes, probably Hottentots, who evidently did not know then, as they do now, how to work the abundant iron-ore of their country. At Saldanha Bay, in 1598, John Davis could get fat-tailed sheep and bullocks for bits of old iron and nails; and in 1604 a great bullock was still to be bought for a piece of an old iron hoop. But only seven years later, Nicholas Downton, "Captaine of the Pepper-Corne," begins to write ruefully of the change in this delightful state of things, "Saldanha having in former time been comfortable to all our nation travelling this way, both outwards and homewards, yeelding them abundance of flesh, as sheepe and beeves brought downe by the saluage inhabitants and sold for trifles, as a beife for a piece of an iron hoope of fourteene inches long, and a sheepe for a lesser piece;" but now this is at an end, spoilt perhaps by the Dutchmen, "who used to spoyle all places where they come (onely respecting their owne present occasions) by their ouer much liberalitie."[2]

In Western Africa, when the god Gimawong came down to his temple at Labode, on the Gold Coast, once a year, with a sound like a flight of wild geese in spring, his worshippers sacrificed an ox to him; killing it, not with an iron knife, but with a sharp stone.[3]

It appears from Herodotus that some of the African Ethiopians in the army of Xerxes, headed their arrows with sharp stones;[4] and

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[1] See Tylor, "Early History of Mankind," pp. 219—222.

[2] Purchas, vol. i., pp. 118, 133, 275, 417.

[3] Römer, p. 54; Klemm, C. G., vol. iii, p. 378; Bosman, "Beschryving van de Guinese Goud-Kust.," &c. Utrecht, 1704, p. 109.

[4] Herod., vii, § 69, 71.

Strabo mentions a tribe in Ethiopia who pointed their reed-arrows in this way.[1]

IMPLEMENTS OF STONE AND SHELL FOUND IN THE WEST INDIES.

Cases A 40, A 41, C 28, C 31, and H 11.

The implements made by the ancient Caribs differ in some respects from those made by other Stone-age races. Although the workmanship is frequently coarse, and the design is rude and grotesque, yet the stone implements of the ancient Caribs show immense variety in form and a considerable attempt at ornamentation, whilst the patience and the skill evinced in working very hard stones into elaborate shapes is remarkable.

St. Domingo.

All the objects shown from this island were collected by Sir Robert Schomburgk, who writes of the Caribs of St. Domingo in the following terms:—"The last remnant of them, amounting to 300 or 400, retired under Enrique, the last of the Caciques of the island, to Boya, a village about thirty miles to the N.N.E. of the city. This wretched fragment of a once powerful nation soon vanished from the earth, and, in 1851, not a single pure descendant of the millions who, at the discovery, peopled St. Domingo existed. Their language lives only in the names of places, rivers, trees, and fruits, but all combine to show that the people who bestowed these names were identical with the Carib and Arawak tribes of Guiana. The figures carved of stone, and worked without iron tools, denote if not civilisation, a quick conception, and an inexhaustable patience to give to these hard substances the desired forms, With respect to the age or epoch when the figures sculptured of stone were executed there is no tradition. It is remarkable that they are only found where there is sure evidence that the Caribs inhabited or visited the place."[2]

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[1] Strabo, xvi., 4. 9, 11.

[2] "Ethnological Researches in Santo Domingo," in the "Report of the British Association," July, 1851, pp. 90—92.

Some wedge-shaped stone hatchets, which differ slightly in type from those found in Europe, are shown. There are also some grooved stone hatchets in the collection, and some with wing-like projections near the butt end; the former were, probably, hafted by passing a withe around the grooved part, the projections of the latter no doubt were intended to assist in securing them to the handle. Some of the hatchets, such as that shown by fig. 11, are ornamented with carving. Two similar specimens are preserved in the Christy Museum. Another is in the collection of Mr. Hodder M. Westropp, of Rookhurst, Cork; and a fourth is in the Clermont Museum. This last was found at Aigueperse, near Riom, Puy de Dome, France; but is probably of Carib workmanship. The Aigueperse specimen differs from the others in being almost equally pointed at both ends. The figure sculptured upon it, represents a human head wearing a conical cap; the bust and arms are not given. Fig. 12 represents a stone club in the collection; it measures sixteen inches in length.

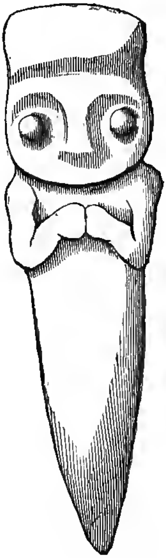

Fig. 11.

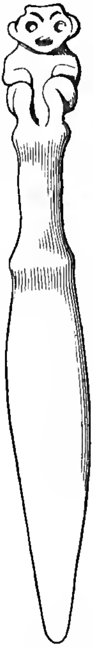

Fig. 12.

The series of stone pestles, used probably for pounding maize, is large and interesting, some of the varieties are shown by figs. 13 to 19.

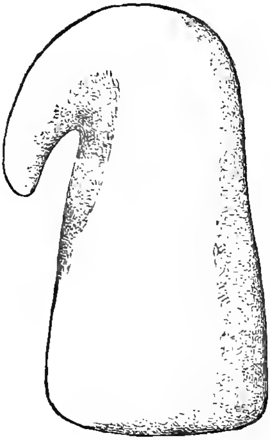

Fig. 13.

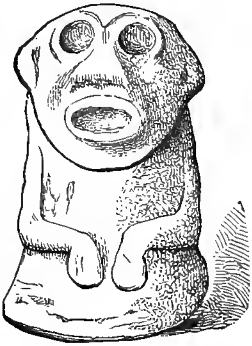

Fig. 14.

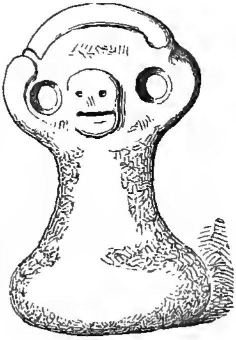

Fig. 15.

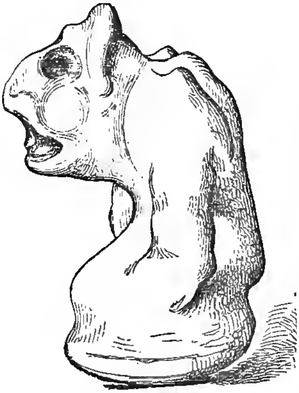

Fig. 16.

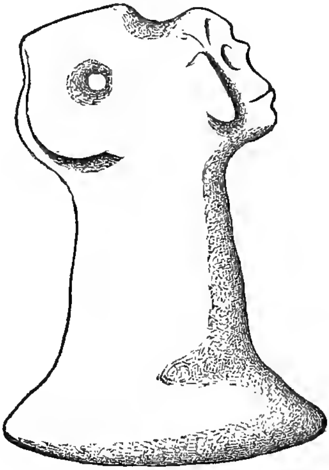

Fig. 17.

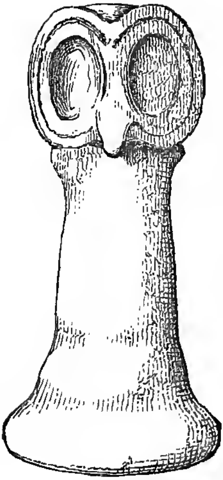

Fig. 18.

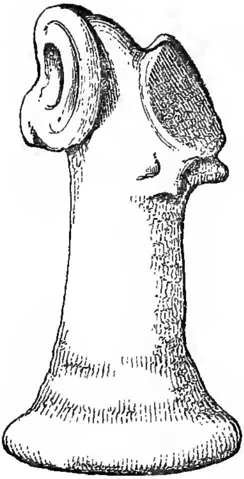

Fig. 19.

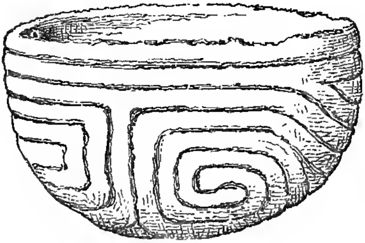

Fig. 20.

The stone bowl, fig. 20, may have been used as a mortar in which to bruise grain, it measures five inches and a half in diameter. The mealing-stone, fig. 21, is eight inches and a half in length, six inches and a quarter in breadth, and four inches and a quarter in height.

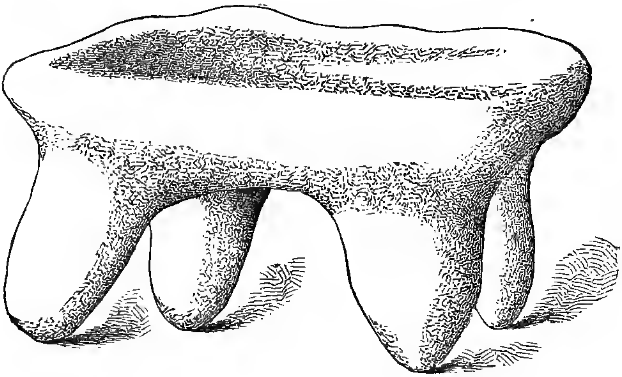

Fig. 21.

The presence, in the collection, of so many implements for crushing grain, from the West Indies and the mainland of America, may astonish some persons, who have been accustomed to regard the aborigines of the New World as hunters, and not as tillers of the soil. There is, however, some very interesting evidence of the indigenous character and origin of American agriculture. It does not appear to have been "imported from abroad; it resulted from, and in return rendered possible, the gradual development of American semi-civilisation. This is proved by the fact that the grains of the Old World were entirely absent, and that American agriculture was founded on the maize, an American plant."[1]

It is also interesting to notice that the implements used by the aborigines of America for grinding corn differ from those used by pre-historic races in the Old World. The form of the aboriginal implement for converting grain into meal was, probably, as little imported into the New World as was the grain itself. Grain throughout that vast continent is, and was, either pounded in mortars of wood or stone, or reduced to a coarse powder upon some form of stone table; but no true quern, consisting of two stones made to revolve on each other, appears, at any time, to have been in use among the aborigines of America.[2]

In the Old World the grinding of grain appears to have been effected, usually, by two persons, probably women, who sat facing each other, the quern was placed between them, one grasped the handle and turned the upper stone half way round, her companion's hand was ready to take the handle, and she turned it the other half way round, and so the work was continued. In America many plans for lightening the labour of grinding were adopted, such as suspending the stone pestle from the limb of a tree, which, acting as a spring, lifted the pestle;[3] but the simple idea of reducing grain to powder between two stones, the one being made to revolve upon the other, has apparently been overlooked.

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[1] "Pre-historic Times," second edition p. 278; "Flint Chips," *l.c.*, pp. 529, —546.

[2] See Ante, pp. 107, 108.

[3] Schoolcraft, "Archives, &c.," vol. iv., p. 175.

The sculptured stone collar, figs. 22 and 23, is a very remarkable specimen, it measures ten inches and a half in its lesser and fifteen inches and three quarters in its greater diameter.

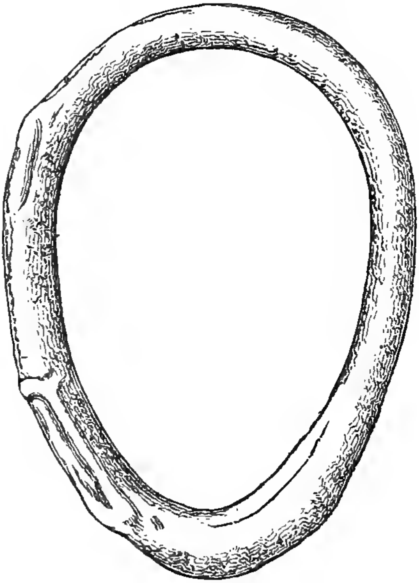

Fig. 22.

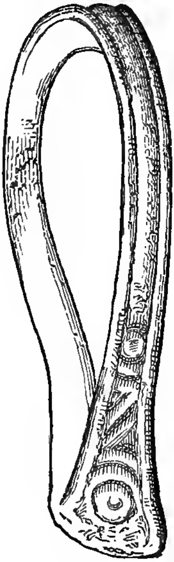

Fig. 23.

One of these elliptical stone collars was exhibited to the Society of Antiquaries, London, January 21st, 1869, by Mr. Josiah Cato, who made the following observations upon these objects:—

"The ancient stone ring which I have the honour of exhibiting to the Society of Antiquaries this evening is an object of extreme rarity in English collections, and of quite unknown use. It was brought to this country in December, 1865, by my friend, Mr. E. B. Webb, of 34, Great George Street, from the island of Porto Rico, where it was found.

"It is formed from a boulder of light coloured volcanic stone, is seventeen inches and a half in its greater, and fourteen inches and a quarter in its lesser diameter. The elliptical perforation has a major axis of twelve inches and one-eighth, and a minor axis of eight inches and a quarter. The weight is twenty-five pounds and a half (avoirdupois).

"Externally, the ring has two distinct ornaments; one, at the end of the ellipse, and the thickest part of the ring is *chevronnée,* with nine incised chevronels. The other, on the side of the ellipse, may perhaps be intended to represent the ends of a hoop which have been laid together and bound by a ligature. This second ornament appears on other specimens found in the same island, but the chevronels are replaced by other designs. I am not aware that the human figure is in any case represented.

"The example before the society was exhumed from a considerable depth from the surface, near the top, but on the southern side of the *sierra,* or range of hills, which runs east and west nearly throughout the length of the island. It is supposed to be the only specimen from this southern slope, but Mr. Webb saw several which had been found on the northern, anciently the more populous side of the island. They included about five entire rings, and fragments of about as many others. They were all in the possession of one person, who would not part with them, and were all which were then known to have been found in the island; but Mr. Franks has kindly pointed out to me that a similar ring is engraved in the 'Mémoires de la Société Royale des Antiquaries du Nord,' in a report by C.C. Rafn on the 'Cabinet d'Antiquités Américaines à Copenhague, 1858,' and that it is said to be from the island of Porto Rico.

"A similar ring, but of lighter proportions and more finished workmanship, is in the magnificent collection formed by the late Mr. Christy. It is from the island of St. Thomas, and may have been obtained by Mr. Christy, in exchange, from the Copenhagen Museum. Its internal diameters are thirteen, and eight and a half inches.

"The only other specimen known to be in this country belonged to the late Sir Robert Schomburgk. It was sold on 1st December, 1865, by auction at Stevens's, and is now in the museum formed by Mr. Blackmore, at Salisbury. Its internal diameters are twelve inches and a half, and eight inches and a quarter.

"Dr. Wilson, in his 'Prehistoric Annals of Scotland' (vol. i., p.

222), engraves two stone collars, which are somewhat like the specimens in the Blackmore and Christy Collections, and are said to have been found near the parallel roads of Glen-Roy. Judging only from the engraving, they are, however, very much more likely to have come from the Caribbean islands.

"With regard to the probable use or purpose of these rings I can give no information, but shall be very much obliged for any suggestion, or for hints as to any works likely to contain such an account of the customs of the nations at the time of the Spanish invasion as may afford a clue to the mystery.

"Such elaborate pieces of work in hard stone could not have been intended to serve either a temporary or a trifling purpose. They are all far too heavy for ordinary use, but yet not heavy enough to kill, or even to greatly torture the wearer, if we regard them as collars of punishment.

"Of the many suggestions I have yet received none seem applicable alike to each of the known examples, and I can only hope that my exhibition to-night may result in clearing all doubt on the subject."[1]

BARBADOS.

Case A 41.

Some hatchets of stone and shell, and some fragments of pottery, from Barbados, are shown. These specimens were presented to the collection by the Rev. Greville J. Chester, who has kindly furnished the following information respecting them:—"In Bardados there is no hard stone, nothing harder than coralline limestone; the aborigines therefore were obliged to import hard stone implements and weapons from the other islands, or from the main continent of South America. For ordinary purposes, however, they used implements made of various kinds of marine shells, especially the *Strombus gigas*, and, what is most interesting, the *fossil* shells from the limestone. These shell implements are found of several sizes, and some in my possession are small and beautifully formed. In the commonest type the natural curve of the shell formed the handle. Discs and beads made of shell, and large quantities of pottery, in a fragmentary state, have been found associated with the shell implements. The use of an implement somewhat resembling a hone has not been satisfactorily ascertained, only one specimen out of the considerable number which have passed through my hands, being worn down by use.

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[1] "Proceedings Soc. Antiquaries," 2nd series, vol. iv., No. 5, pp. 215, 216.

"The large number of implements discovered under rock-shelters, and in gullies, prove the existence of a large native population in Barbados, and as shell hatchets are not found in the other West Indian Islands, it is clear that they are of purely local origin. In the parish of St. James several cart-loads of shell implements were found lying together; they were carried away to macadamise a road. Near the chapel of St. Luke, in a small gully, at the very centre of the island, I picked up seven shell implements in the space of ten minutes, as well as a quantity of pottery. The favourite spots for the habitation of the shell-workers seem to have been under rock-shelters, at the entrance of caves in the limestone rocks, and upon the sloping sides of the numerous 'gullies' which form the most characteristic feature of the scenery in Barbados. 'Indian river' in St. Michael's parish, the neighbourhood of the fresh-water springs on the borders of St. Michael's and St. James's, and the springs on the Codrington College estate in St. John's, appear all to have been centres of population. I have several well-made implements, of hard green and black stone, found in Barbados; one of these is only one inch and a quarter long. I have also a small and beautifully formed implement in the shape of a knife, made of yellowish alabaster, and a kind of stamp of the same material."

Some of the Barbados shell implements have a gouge-like appearance; the hollow, however, is natural, and in no instance has it been extended by artificial rubbing to the cutting edge, hence they are not to be regarded as true gouges, but as hatchets. Similar implements made of shell are found in the shell-mounds on the banks of the St. John's River, East Florida.

Several shell hatchets, in recent use in Melanesia and elsewhere, some of which are in the original handles, may be seen in the collection.

ST. VINCENT.

Case A 41.

A hatchet of greenstone, found in Buccament Valley, is shown; it was presented to the collection by the Rev. Greville J. Chester.

JAMAICA.

Case A 40.

Some stone hatchets from Jamaica are in the collection; they were presented by the late Mr. G. Witt, and Mr. Newell V. Squarey.

(To be continued.)

H. F. & E. BULL, Printers and Publishers, Saint John Street, Devizes.